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1990 *RUN* Index

RUN

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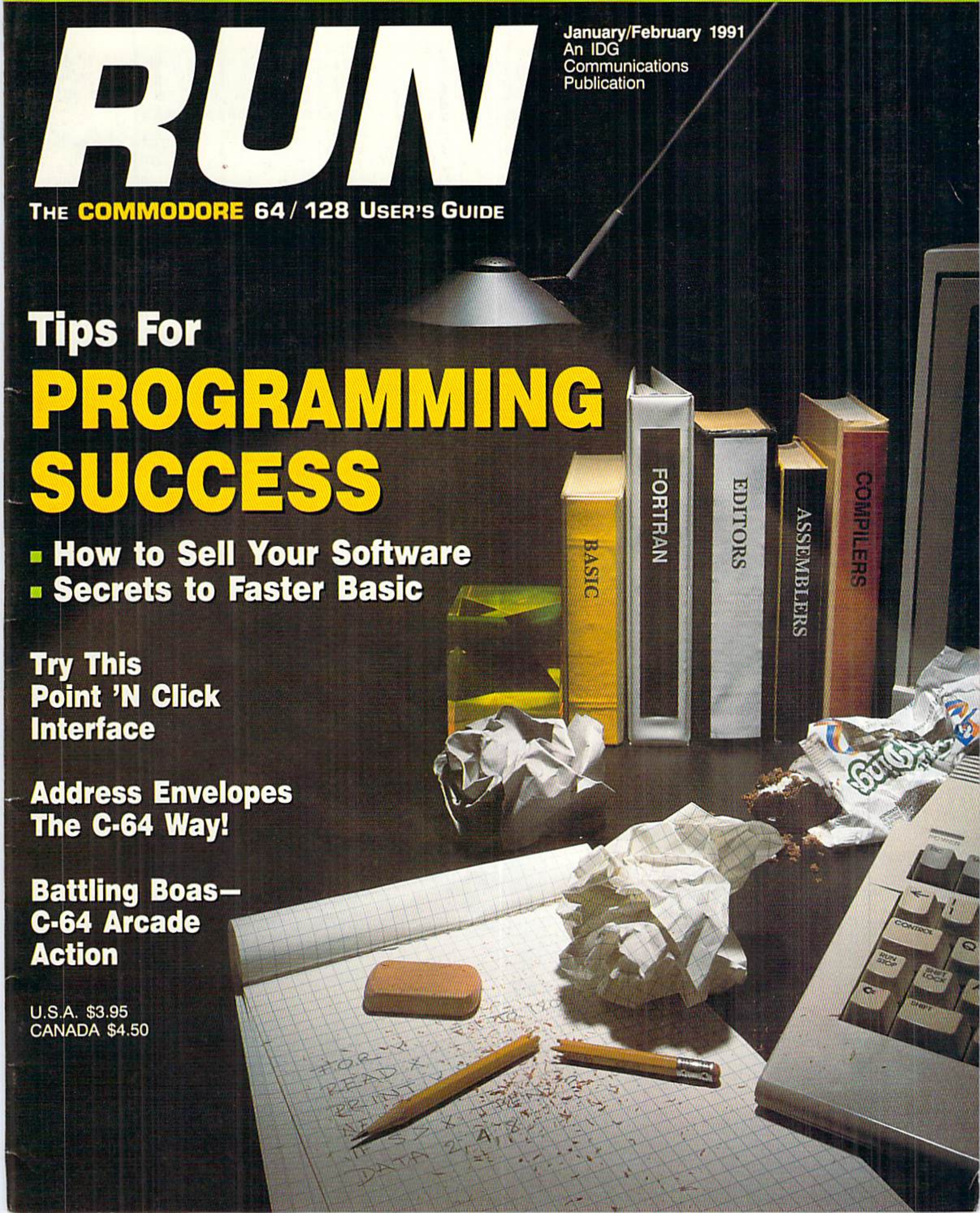
THE COMMODORE 64 / 128 USER'S GUIDE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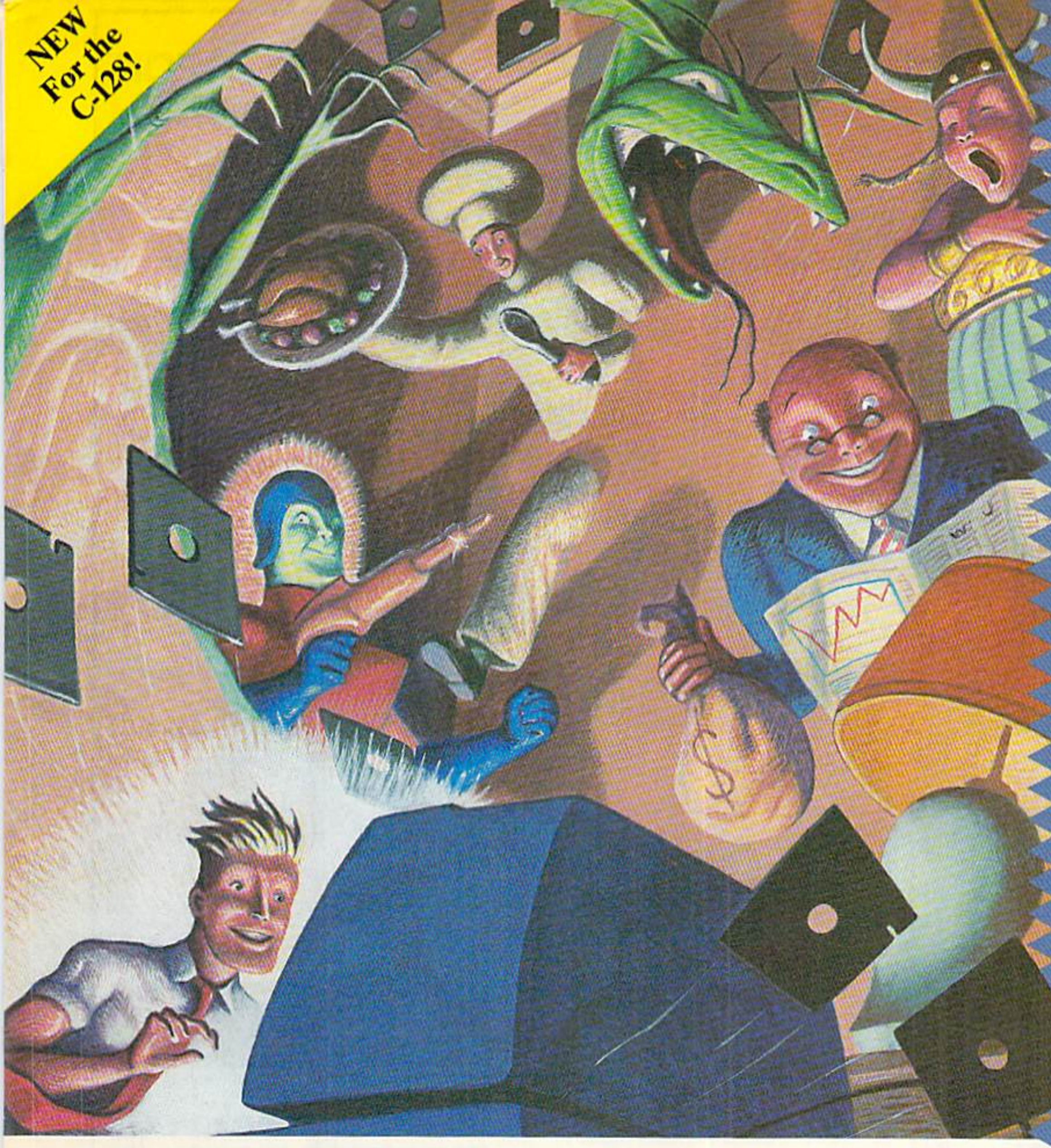

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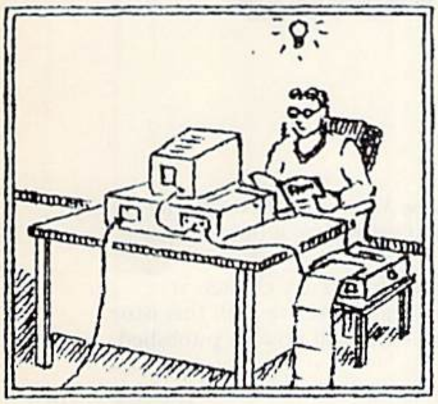

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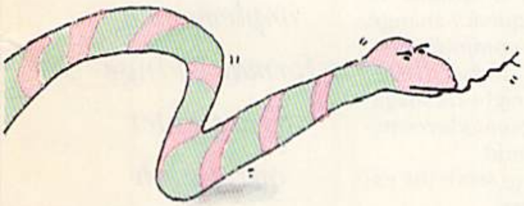

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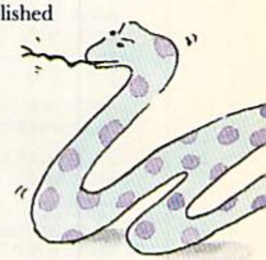

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RUNNING RUMINATIONS

A TIME OF CHANGE

Dear *RUN* Readers,

With this issue, we welcome in a New Year as *RUN* begins its eighth year of publishing. It's a time of reflection, a time of new beginnings and a time of change.

Less than a year ago, we announced a frequency change at *RUN*—from monthly to ten times per year. Effective with this issue, we are implementing another change: *RUN* will now be published bimonthly.

In a market experiencing little growth, such as the Commodore eight-bit market, magazines must sometimes adjust their format slightly to continue to deliver a quality publication. This frequency change, in effect, demonstrates our resolve to continue serving Commodore users in this market. In fact, *RUN*, as the ONLY dedicated Commodore eight-bit magazine, and also the longest-running Commodore-specific publication, feels a commitment and responsibility to continue publishing to serve the existing community of Commodore users!

RUN will implement a format change as we enter our eighth year of publishing.

◇

Please be advised that this move does not affect current subscribers, whose subs will be honored and fulfilled under terms prior to this announcement.

Our enthusiasm for this market is no less than it was when we started covering the VIC-20 and the "brand new" Commodore 64 computers eight years ago. We've heralded many exciting products and developments since then. Many issues and many deadlines later, we're still having fun (but don't let the boss know). Thank you for your faith and support of *RUN* over the years.

The job is far from over, however. Many beginning and intermediate users still need assistance in getting the most from their computing systems. First-time users, especially, need special instruction. And, there are many potential users out there who need to be convinced that Commodore is the computer of choice. (How can millions of users be wrong!)

Over the years, readers have come to rely on *RUN* as a valuable source of information for tutorials, type-in programs, news, computing hints, answers to reader questions, as well as what products to buy, and those to avoid. In addition to these regular features and columns, *RUN* will have the opportunity to experiment in the coming months with new formats and content. In the bimonthly format, you can look forward to MORE editorial pages than in recent issues. Also, you can expect some exciting new features—as well as new authors and programmers—in the coming months. Stay tuned.

I have publicly stated that *RUN* is committed and obliged to continue to serve this market. *RUN* will keep that promise. Each issue is dedicated to helping Commodore users find productive, entertaining and interesting uses for their computers. As long as there are C-64/128 users who need a magazine, *RUN* will be here. We hope you will stay with us.

Dennis Brisson

Dennis Brisson
Editor-in-Chief

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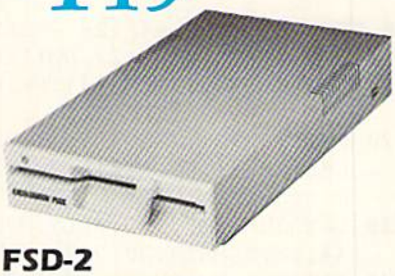

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MAGIC

Tricks to kick off the new year in style. Free up stuck keys, create a calendar, and detect whether or not your printer is on.

By TIM WALSH

$5B2 CALENDAR 64/128

To kick off the start of a new year, here's a calendar creation program for both the C-64 and C-128 in 40- and 80-Column modes. It accurately creates a calendar for any month between the years 1905 A.D. and 2300 A.D.

At the prompt, enter the number of the month, followed by the year. The calendar for that month is displayed instantly. To print the calendar on the printer, place the command OPEN 4,4:CMD4 at the end of line 110.

```
0 REM CALENDAR 64/128 - JAY TAPLIN:REM*168
10 DIMMD(12),MO$(12),NO(12):FORJ=1TO12:REA
   DMD(J),MO$(J),NO(J):PRINTJ;MO$(J)
                                   :REM*220
20 NEXT:DATA1,JANUARY,31,32,FEBRUARY,28,60
   ,MARCH,31,91,APRIL,30,121,MAY,31,152
                                   :REM*235
30 DATAJUNE,30,182,JULY,31,213,AUGUST,31,2
   44,SEPTEMBER,30,274,OCTOBER,31 :REM*117
40 DATA305,NOVEMBER,30,335,DECEMBER,31:INP
   UT"MONTH";M:INPUT"YEAR";Y        :REM*44
50 SD=((((Y-1900)*365)+INT((Y-1900)/4)+MD(
   M)))-((Y-1900)*364)+1           :REM*203
60 VV=INT((Y-1900)/200):SD=SD-VV:VD=SD-((I
   NT(SD/7))*7)                    :REM*203
70 FORJ=1TO5:L$(J)="":NEXT:IFVD=1THENGOTO9
   0                               :REM*123
80 FORJ=2TOVD:L$(1)=L$(1)+"{3 SPACEs}":NEX
   T                               :REM*231
90 CC=VD:LC=1:FORJ=1TONO(M):L$(LC)=L$(LC)+
   RIGHT$("{2 SPACEs}"+STR$(J),3):CC=CC+1
                                   :REM*121
100 IF CC=8THENCC=1:LC=LC+1        :REM*242
110 NEXT:PRINT"{SHFT CLR}";:V$=MO$(M)+"{2
    SPACEs}"+STR$(Y):PRINTSPC(11-(LEN(V$)/
    2))+V$:PRINT                   :REM*249
120 PRINT"{2 SPACEs}S{2 SPACEs}M{2 SPACEs}
    T{2 SPACEs}W{2 SPACEs}T{2 SPACEs}F{2 S
    PACEs}S":PRINT:FORJ=1TO5:PRINTL$(J);CH
    R$(13):NEXT                    :REM*165
130 GOTO40                           :REM*1
```

—JAY TAPLIN, HAMPDEN, ME

$5B3 STUCK KEY SUBSTITUTE 64

Sooner or later, a key will stick on your computer's keyboard. To put off the unpleasant job of disassembling the computer for at least a little while, I wrote Stuck Key Substitute 64.

This program redefines the back-arrow key as a "d," but it can be redefined as any character you desire. To print another character, change the ASC code in line 70 as desired. Programmers will note that the entire routine is relocatable in memory.

```
0 REM STUCK KEY SUBSTITUTE 64 - RICHARD PE
  NN                               :REM*198
10 POKE1,55:POKE 56334,PEEK(56334)AND 254:
   POKE 95,0:POKE 96,160:POKE 90,255
                                    :REM*13
20 POKE 91,255:POKE 88,255:POKE 89,255:SYS
    41919:POKE 65535,PEEK(65535)   :REM*196
30 POKE 56334,PEEK(56334)OR1:POKE 56324,14
   9:POKE 56325,66:POKE 1,53        :REM*12
40 X=679:FORT=X TO X+8:READ D:POKE T,D:NEX
   T                               :REM*242
50 POKE 771,X/256:POKE 770,X-PEEK(771)*256
                                   :REM*132
60 DATA 72,169,53,133,1,104,76,131,164
                                   :REM*120
70 X=ASC("D"):REM ENTER ASCII CODE HERE
                                   :REM*113
80 POKE 60289+57,ASC("D"):PRINT"BACK-ARROW
    KEY NOW PRINTS: "CHR$(X)        :REM*79
```

—RICHARD PENN, MONTREAL, QUEBEC

$5B4 ADDING PROGRAM LINES VIA 80 COLUMNS

Using the C-128 and a combination 40/80 column monitor, you can easily add routines and lines of code to Basic programs. Just load and list the lines to be inserted on the 80-column screen. Press the ESC/X key combination and switch the monitor to 40-Column mode. Load the program that needs the lines added to it.

Renumber that program to allow for the lines listed on the 80-column screen to be inserted. Switch back to the 80-column screen and press return on each of the lines still visible on that screen to add them to the program on the 40-column screen. Only one screen of program lines can be added at a time in this manner, but that's all you'll usually need.

—F. B. WOESTEMEYER, WEST CHESTER, PA

$5B5 C-128 RAM CHARACTERS

Here's a short machine language routine that copies the contents of the C-128's 40-column character ROM into RAM at locations 8192 to 10239. Once the characters are in RAM, you must enter the following line in Direct mode for the computer to find them:

```
POKE 217,4: POKE 2604, PEEK (2604) AND 240 OR 8
```

You'll know the routine is active if the screen clears when tog- ►

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```
0 REM 128 RAM CHARACTERS - CHRIS HAYOSH
                                    :REM*138
10 FAST:FOR T = 3072 TO 3114:READ D:POKE T
    ,D:NEXT:GRAPHIC1,1:GRAPHIC0:SYS 3072:SL
    OW                              :REM*28
100 DATA 160,0,169,0,133,251,169,208,133,2
     52,169,0,133,253,169,32,133    :REM*246
110 DATA 254,169,1,141,0,255,177,251,145,2
     53,200,192,255,208,247,230,252:REM*160
120 DATA 230,254,162,216,228,252,208,237,9
     6                              :REM*92
```

—Chris Hayosh, E. Lansing, MI

$5B6 PRINTER CHECK 64/128

How many times have you had a program crash or quit because either the printer was off or you forgot to turn it on? Use this short routine, Printer Check 64/128, in both your C-64 and C-128 programs to detect whether the printer is on or off. Your programs won't crash again with these few lines of code installed.

```
0 REM PRINTER CHECK 64/128 - FRANK J. LIVE
   RS                               :REM*222
10 OPEN4,4,7:CLOSE 4                :REM*249
20 IF ST <> 0 THEN PRINT "PROBLEM WITH PRI
   NTER":GOTO 40                    :REM*54
30 PRINT"PRINTER IS ON-LINE & FINE":REM*67
40 PRINT "RUN AGAIN Y/N?"           :REM*73
50 GETA$:IF A$="" THEN 50           :REM*13
60 IF A$="N" THEN END               :REM*176
70 GOTO 10                          :REM*192
```

—Frank J. Livers, Mason City, IA

$5B7 DISK UTILITIES 64/128

Disk Utilities 64/128 is a short disk maintenance program that offers three functions for all Commodore disk drives in both 64 and 128 modes. Options one and two let you lock and unlock files, respectively, on any type of disk. The third disk option displays the number of files on a disk. Choose the fourth option to quit the program. To use the program on a 1581 disk drive, simply change the value of T to 40 and S to 3 in line 20.

```
0 REM DISK UTILITIES 64/128 - HENNING VAHL
   ENKAMP                           :REM*90
10 OPEN1,8,15,"I":OPEN 2,8,2,"#"    :REM*186
20 Z$=CHR$(0):T=18:S=1:PRINTCHR$(147)"1. L
   OCK":PRINT"2. UNLOCK"            :REM*50
30 PRINT"3. COUNT FILES":PRINT"4. QUIT":IN
   PUT "ENTER OPTION 1-4";CH        :REM*238
40 ON CH GOTO 50,50,60,250          :REM*81
50 INPUT "FILE NAME ";F$            :REM*117
60 PRINT#1,"U1";2;0;T;S:GET#2,T$,S$:T$=T$+
   Z$:S$=S$+Z$                      :REM*102
70 IF CH=3 THEN 130                 :REM*113
80 FOR V=0 TO 224 STEP 32:FOR I=V+5 TO V+2
   0                                :REM*38
90 PRINT#1,"B-P";2;I:GET#2,A$       :REM*38
100 IF A$<>CHR$(160) THEN N$=N$+A$:REM*187
110 NEXT:IF N$=F$ THEN 200          :REM*82
120 N$="":NEXT:GOTO 150             :REM*68
130 FOR B=2 TO 256 STEP 32          :REM*232
140 PRINT#1,"B-P";2;B:GET#2,A$:IF A$<>"" T
    HEN N=N+1:NEXT                  :REM*229
150 S=ASC(S$):IF ASC(T$)>0 THEN 60:REM*144
160 IF CH<> 3 THEN 230              :REM*219
170 PRINT"{CRSR DN}"N" FILES ON DISK"
                                    :REM*56
180 GET K$:IF K$="" THEN 180        :REM*164
190 GOTO 20                         :REM*57
200 PRINT#1,"B-P";2;I-19:GET#2,A$   :REM*49
210 IF CH=1 THEN A=ASC(A$) OR 64    :REM*233
220 IF CH=2 THEN A=ASC(A$) AND 191 :REM*20
230 PRINT#1,"B-P";2;I-19:PRINT#2,CHR$(A);
                                    :REM*2
240 PRINT#1,"U2";2;0;T;S:GOTO 20    :REM*172
250 CLOSE 1                         :REM*253
```

—Henning Vahlenkamp, Matawan, NJ

$5B8 READING ELUSIVE C-128 KEYS

Here's a short program that detects when the ALT, Commodore, shift, control or caps lock keys are pressed. By examining the code, you'll note that this is accomplished by monitoring the value in location 211. If you want to expand the routine to detect when a combination of keys, such as the ALT and shift keys, are pressed simultaneously, just use the following code:

```
1 GETKEY A$
2 PRINT PEEK (211)
3 GOTO 1
```

The value of location 211 will be displayed when a combination of the keys listed above are pressed.

```
0 REM ALT/COMMODORE/SHIFT/CONTROL/CAPS LOC
   K 128 - HENNING VAHLENKAMP       :REM*23
10 DO:V=PEEK(211):A$="KEY":B$=CHR$(147)
                                    :REM*124
20 IF V=1 THEN PRINTB$"SHIFT "+A$ :REM*185
30 IF V=2 THEN PRINTB$"COMMODORE " +A$
                                    :REM*90
40 IF V=4 THEN PRINTB$"CONTROL " +A$
                                    :REM*112
50 IF V=8 THEN PRINTB$"ALT " +A$   :REM*208
60 IF V=16 THEN PRINTB$"CAPS LOCK " +A$
                                    :REM*181
70 LOOP                             :REM*51
```

—Henning Vahlenkamp, Matawan, NJ ■

Magic is a forum for RUN*'s imaginative and inventive readers to share their programming tips, brief software or hardware modifications, shortcuts or items of general interest. If you have an idea to make computing easier, faster, more exciting and enjoyable, send it to: Magic, RUN Magazine, 80 Elm St., Peterborough, NH 03458.*

RUN *pays $10 to $40 for each trick published in the column. If you'd like a copy of the latest edition of* RUN*'s Magic Trick Writer's Guide, send your request with a self-addressed, stamped, business-size envelope; you'll receive a copy in two or three weeks.*

Things to do.

People to see.

Places to go.

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Fall in love.
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Learn to cook.
Bargain hunt.
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NEWS AND NEW PRODUCTS

Buck Rogers and Carmen Sandiego come to the computer screen, and Commodore announces a new support service for C-64 owners.

DESPERATELY SEEKING SUPPORT

WESTCHESTER, PA—The Commodore Express program, a toll-free helpline and door-to-door customer service program for Amiga 500 owners, has been extended to include the C-64. Now new C-64 owners seeking assistance in setting up and operating their computers can call 1-800-448-9987 at any time. If your system needs service, Commodore has arranged for Federal Express to provide free pick-up and delivery of your equipment under warranty.

And what about C-128 owners? According to Commodore, the C-128 line is still supported through the company's regular customer relations line: 215-436-4200.

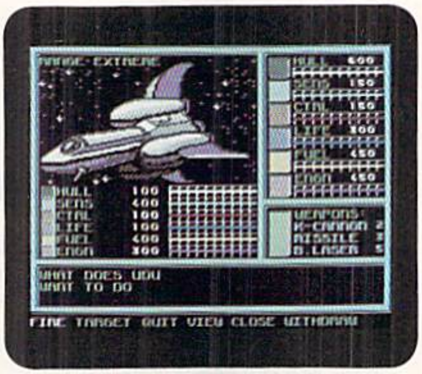
WINNER ANNOUNCED

BEDFORD, MA—A new version of CALC, by David Pankhurst of Montreal, was the $1000 prize winner in the programming contest sponsored by Brown Boxes. The winning spreadsheet program is available through Brown Boxes for $25 and is compatible with the Quick Brown Box battery-backed RAM cartridge. With this program and cartridge combination, you can maintain and update financial records almost instantaneously. For further information about **CALC QBB V1.5** or the QBB battery-backed RAM cartridge, contact Brown Boxes, Inc., 25 Concord Road, Bedford, MA 01730.

A RETURN TO THE 25TH CENTURY

SUNNYVALE, CA—Buck Rogers has finally caught up with the computer age. **Countdown to Doomsday** is the first in a series of Buck Rogers science fiction computer games scheduled for release by Strategic Simulations.

Buck Rogers debuted in 1929 in a comic strip depicting the 25th century with technology that, at the time, scientists could only envision. The setting for this futuristic role-playing computer game is the year 2456. Your mission is to save the solar system from the deadly grasp of the powerful Russo-American Mercantile (RAM). As you explore the solar system with a team of Rocketjocks, Warriors, Engineers, Rogues and Medics, characters gain valuable skills such as piloting, zero-g maneuvering and demolition.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CTRL 150
LIFE 300
FUEL 450
ENGN 450

HULL 100
SENS 400
CTRL 100
LIFE 100
FUEL 400
ENGN 300

WEAPONS:
K-CANNON 2
MISSILE 3
B.LASER 5

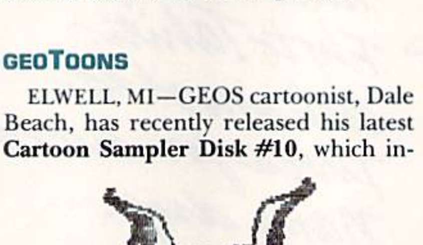
WHAT DOES YOU
WANT TO DO

A look at future science in Buck Rogers' 25th century world.

The program is available for $39.95 from Electronic Arts (1820 Gateway Drive, San Mateo, CA 94404). A clue book is also available for $12.95.

GEOTOONS

ELWELL, MI—GEOS cartoonist, Dale Beach, has recently released his latest **Cartoon Sampler Disk #10**, which includes over 45 cartoons in GEOS format and GRAPHITI, a GEOS-compatible font. It's available for $7 from Cartoon Sampler, 7048 Michigan St., Elwell, MI 48832.



A sample from the GEOS cartoon sampler.

REVEALING STATS

PASADENA, CA—In case you've been wondering what makes the home office worker tick, the American Institute of Computer Technology has all the answers in its recently released survey, conducted earlier this year. If you work from your home with your computer, then chances are you're a 35-year-old male with at least 2 years of college, you earn $24,000 a year and are interested in earning an additional $20,000 per year working at home with your IBM or compatible computer. The composite shows the typical respondent as one who would like to start his own business, but is not sure how to begin. He buys six books a year, for $18 each, and also buys three $113-software programs a year. He would buy more software, if it weren't for the high prices, the hard-to-understand documentation, poor technical support from the developers and the long learning curves required by most programs.

So, now you know!

NEW C-64 DESIGN

RACINE, WI—Does your old C-64 setup tend to cramp your style? With a detached keyboard from SER (PO Box 85382, Racine, WI 53408), you won't feel tied down to your system. This replacement keyboard comes with a 6 foot cable that gives you the freedom to move around and also to arrange your work area the way you want. The keyboard costs $45, plus $3 for shipping/handling.

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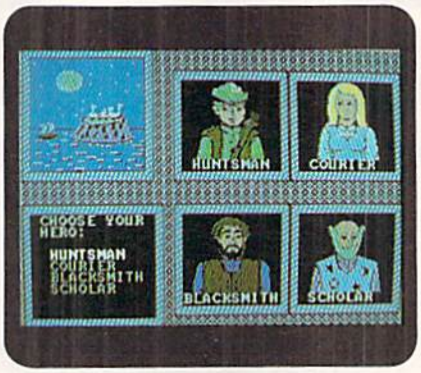
Fitzgerald Drive, Jaffrey, NH 03452). This neat way to organize your computing work area consists of a ten-slot cord manager, clips to group loose cables together and to secure cables to the wall, floor or table, and labels to identify the cords. The price of **Cable Organizers** is $9.95.

TIME TRAVEL WITH CARMEN

SAN RAFAEL, CA—Carmen Sandiego is back as a time traveler in the lastest release from Broderbund (17 Paul Drive, San Rafael, CA 94903). Carmen and her band of henchmen visit such historic sites as Spain in 1492, England in 1215 or India during its "Golden Age" in the 8th century. Your mission is to track down the miscreants, as you travel to the time and scene of the crime and question witnesses to unearth clues.

While previous releases in this best-selling series have focused on geography, **Where in Time is Carmen Sandiego?** emphasizes history, which, according to product manager Claire Curtin, "is a logical extension for the Carmen Sandiego series."



Carmen Sandiego takes a trip back in time.

The game, which comes with a 1300-page reference book, *The New American Desk Encyclopedia*, costs $39.95.

SOFTWARE FROM SILVA

CHARLOTTE, VT—Silvasoft, PO Box 1006, Charlotte, VT 05445, has announced two new programs for the C-64/128: **MasterPaint** is a multi-featured paint program written in Basic 8 for the 128. Users need an 80-column RGB monitor and either a 128D or a C-128 with 64K VDC RAM. **Pixelmaster** is a C-64 graphic translation program that lets you convert graphic images to/from your favorite paint program. It supports over 40 graphic formats. Each program costs $28.50.

GRAPHIC DESIGN

SAN FRANCISCO, CA—**Digital Artist** is a graphic design tool that lets you create business reports, flowcharts, technical illustrations or other documents combining text and graphics. This powerful C-64 program includes 17 drawing tools, eight graphic editing functions, multiple fonts and text styles, proportional spacing and a WYSIWYG text editor, among other features. It's available for $69.95. For further details, contact Digital Technology, Inc., 135 Collins St., San Francisco, CA 94118. ■

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The CMD HD series of hard drives for the Commodore 64 and 128 have been designed to provide the highest level of compatibility and performance. These drives incorporate the latest in SCSI technology with advanced circuit design to bring you the most features at an affordable price. CMD drives allow you to achieve the higher level of productivity you require to get the most from your existing software - today!

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HD-20 $599.95 · HD-40 $799.95 · HD-100 $1149.95 · HD-200 $1499.95

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- **1581 support.** Simplified partition selection.
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The Ultimate Disk Drive Speed Enhancement System

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Each system includes computer Kernal ROM(s) and one drive ROM.
Please specify computer and drive model numbers and serial numbers when ordering.
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- **100% Compatibility Guarantee** - Guaranteed to work with all Software and Hardware
- **Uses no ports or extra cabling.** ROMs install internally for speed and compatibility.
- **Easy Installation.** No experience or special tools required for most systems.
- **Supports C64, 64C, SX64, C128, C128D, 1541, 1541C, 1541-II, 1571, 1581**
- **Can be completely switched out.** Returns you to a 100% stock configuration
- **Built-in DOS Wedge.** Plus 17 additional commands and convenience features.

- **Built-in two drive file copier.** Supports all file types and drive types.
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JiffyDOS & Lt. Konnector:	Add $4.50 per order (UPS ground), $8.50 (2nd-Day Air), plus $4.00 for APO, FPO, AK, HI, and Canada, or $14.50 for overseas orders. No additional shipping if ordered with any hard drive. COD's to US only - add'l $4.00
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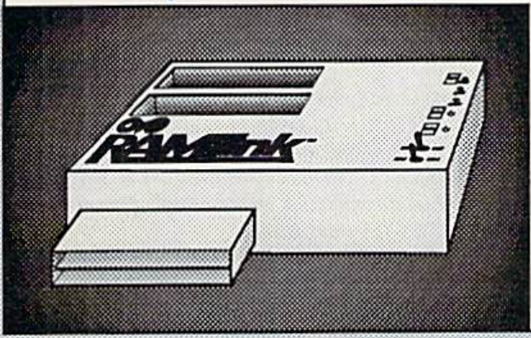

What is RAMLink?

RAMLink is a multi-purpose hardware interface designed to overcome the limitations of existing RAM expansion units (REUs). RAMLink delivers the performance and compatibility lacking in past REU's by incorporating CMD's proprietary RL-DOS and advanced features into a compact unit which allows most software to utilize Commodore 1700 series REU's, GEORAM, PPI's RAMDrive, and CMD's RAMCard as if it were a disk drive. Optional RAMCard installs internally and can be used alone or in combination with the storage of an external REU for a maximum capacity of 16 Megabytes.

- **Supports Commodore 1700, 1764, 1750, Berkeley Softworks GEORAM and PPI's RAMDrive.**
- **Optional RAMCard allows RAMLink to be used as a RAM Disk with or without a separate REU. User Expandable from 1 Mb to 16 Mb using standard SIMMs.**
- **Pass-thru connector allows use of cartridge port peripherals such as utility cartridges.**
- **Reset, Disable, Direct Access mode and SWAP functions are all standard features.**
- **RAM port provides power back-up to REU's.**
- **Parallel port provides ultra-fast data transfer when connected to CMD HD series hard drives.**
- **Includes separate power supply - optional battery available to protect against power failure.**

RAMLink (w/out internal RAM)	$149.95	RAMCard w/ (1 Mb)	$149.95
RAMLink w/ RAMCard (1 Mb)	$259.95	RAMCard w/(2 Mb)	$239.95
RAMLink w/ RAMCard (2 Mb)	$349.95	RAMCard w/ (3 Mb)	$329.95
RAMLink w/ RAMCard (3 Mb)	$439.95	RAMCard w/ (4 Mb)	$419.95
RAMLink w/ RAMCard (4 Mb)	$529.95	1 Mb SIMM (User Installed)	$100.00
RAMLink Battery back-up unit	$24.95	Parallel Cable for CMD HD	$14.95

Shipping: US: **$10.00** (UPS), **$18.00** (2nd day), COD add **$4.00** Canada **$20.00**

BOTH RAMLINK AND RAMDRIVE INCLUDE RL-DOS

- Allows vast amounts of commercial software, including GEOS, to access all available RAM as a high-performance RAM Disk.
- RL DOS performs up to 20 times faster than Commodore RAMDOS, up to 400 times faster than a stock 1541 and provides full DOS command compatibility.
- Up to 32 1541/1571/1581 emulation or Native mode partitions, plus true subdirectories.
- Includes built-in JiffyDOS Kernal for high-speed access to JiffyDOS equipped disk drives.
- Software for copying files (FCOPY) and complete disks (MCOPY) included.
- Many other features, including CMD's exclusive device number SWAP functions.

WHICH ONE IS RIGHT FOR YOU?

Both RAMLink and RAMDrive give Commodore users powerful features never before available in a RAM expander. RAMDrive is intended mainly for those who do not require the high RAM capacity of RAMLink (up to 16 Mb), RAMLink's Pass-Thru port or the parallel port for communicating with the CMD HD Series of hard drives. RAMDrive is an excellent choice for those who desire portability since the internal battery pack can keep the contents of RAMDrive intact for several days. RAMLink is the perfect choice for geoRAM owners who want the ability to use that device with programs other than GEOS. RAMLink has a built-in RAM port for easy use with a geoRAM or Commodore REU. No matter which CMD RAM device you select, you'll benefit from fantastic capabilities of having a high speed RAMDisk equipped with RL-DOS and the outstanding value of CMD support.

What is RAMDrive?

RAMDrive is a fresh new approach to RAM expansion for the Commodore 64 and 128. RAMDrive is a self contained battery backed cartridge with capacities of 512K, 1 Mb and 2 Mb. RAMDrive incorporates RL-DOS, an ultra-fast, easy-to-use operating system similar to the HD-DOS found in CMD HD series hard drives. This proprietary DOS allows various types of partitioning along with compatibility and speed unsurpassed by previous RAM Expansion systems.

- **Compatible with vast amounts of commercial software as an ultra-fast RAM disk.**
- **RL-DOS operates up to 20 times faster than Commodores RAMDOS.**
- **Power back-up eliminates the loss of of files upon powering down the computer while the battery protects data during transportation or power outages.**
- **Available in 512K, 1 Mb and 2 Mb models at incredibly low prices.**
- **DOS includes JiffyDOS Kernal routines for high speed disk access with JiffyDOS equipped disk drives.**
- **Software for copying and GEOS compatibility included.**
- **Reset switch allows computer reset without loosing data in RAMDrive.**
- **Disable switch allows RAMDrive to be disabled at any time.**

RAMDrive w/512K $149.95 **RAMDrive w/1 Mb $199.95** **RAMDrive w/2 Mb $289.95**

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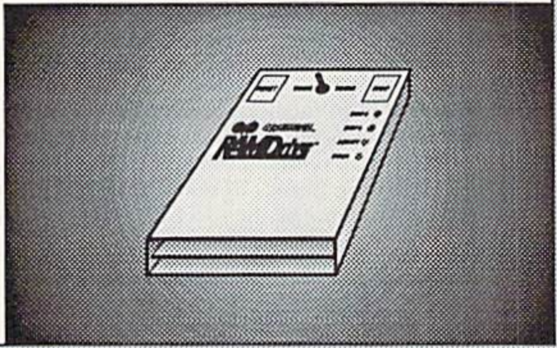

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MAIL RUN

Mail RUNners respond to articles, find ways to keep the beat with a C-64, and compare themselves favorably to the "big boys."

BEST PD PROGRAMS

Stephen Dirschauer's article, "Free Software," (*RUN*, November 1990) was very interesting, but the author left out a few essential C-64 public domain programs. For example, CSlides, a Koala/Doodle! viewer that compresses and uncompresses; Reticulate, a 320X400 interlace demo (on the composite screen!); and Elgato, an amazing 142K animated demo for the REU. These programs are among the best of the best.

—HENNING VAHLENKAMP
MATAWAN, NJ

C-64 ORGAN RECITAL

I built an electronic organ, using three C-64s! One controls the top (swell) keyboard, the second controls the bottom (great) keyboard, and the third controls the foot pedals. An Aprospan four-socket expander is plugged into the expansion port, and the keyboard cables are plugged into the user port. A PC board I designed has two SID chips on it, plus one in a C-64. This gives me eight polyphonic notes. I use the ninth voice for vibrato. The noise simulates brushes.

One of the cartridges, plugged into the Aprospan cartridge of each C-64, is an autostart EPROM program for playing the organ manually.

A second cartridge has a monitor and a store-and-play program. Sheet music can be stored in memory, saved to disk and played back at any speed, tone, or one octave up or down, or what have you!

When storing music, 19 notes can be played at one time by the C-64s!

—GEORGE J. REMILLARD
NORTH ADAMS, MA

THIS SAYS IT ALL

RUN is now the only C-64/128-specific magazine. For those of us who've been called "stupid" for electing to stick with 8-bit machines—what a wonderful computer it is! There's nothing that the big boys can do that I can't, except execute the same type and quality of programs a little faster than I can.

My system consists of a C-128, two 1571 disk drives, a 1750 RAM expansion unit, 1670 modem, Star NX-1000 printer and an Aprospan 64 cartridge port expansion board with a host of cartridges.

I use this computer every day. For example, I wrote this letter with Wordstar 3.3; I use the C-64 Emulation mode to accurately and flawlessly keep my checkbook balanced. In 128 mode, I use Datafile for its larger memory. I can create excellent graphics, compose music, manage my family finances and investments, and I have never heard it complain once over the amount of work I ask it to do or the hour of the day. And, yes, when I've had a hard day, I sit down and vent my frustrations with a good shoot-'em-up.

—COREY C. WEILER
SAUGERTIES, NY

It's unbelievable—even to us—the devotion C-64 and C-128 users have to their computers. Each and every day, we get letters from readers extolling the virtues of their machines. If IBM knew of this devotion and their clients were as devoted, their stock would skyrocket. One editor had been in the retailing business for almost 20 years before he came to RUN. *He had not seen such devotion to a product in those years.*

—EDITORS

TAKING ADVANTAGE OF COLOR

Now that affordable color printers are available, I believe that programs like Newsroom, The Print Shop and PaperClip Publisher, written to take advantage of color printers, would sell very well.

—JAMES OSTROM
JOHNSON CITY, NY

Affordable, Commodore-compatible color printers include the Star NX-1000 Rainbow ($225, reviewed in RUN'*s April 1989 issue), the Citizen 200GX ($275, reviewed in the November 1990 issue of* RUN*), and the Hewlett-Packard Paint Jet ($450). (Prices are quotes from mail order companies.) Also, for readers who are satisfied with their black-and-white printers, but would like color printouts, they can use "The Amazing Sixteen-Color Print Machine" program featured in the July 1988 issue of* RUN *or on the June/July 1988 edition of* ReRUN. *All that's required are a Star- or Epson-compatible printer, Koala-format pictures and color ribbons.*

—EDITORS

MAKE MY DAY

The list of things Commodore users should be happy about (see RUNning Ruminations, November '90) was cute. But if you *really* want to learn to appreciate your Commodore, just try using another machine for a while! It may offer more speed in off-the-wall scientific calculations and such, but you'll soon find yourself wishing that it had the capabilities of your Commodore.

I enjoy being able to just turn on my 64 and go to work without having to wait while it checks memory, loads its DOS, mouse drivers or printer drivers. And if I want to write a short Basic program for a quick job, I don't have to wait while GW Basic loads (besides, GW Basic isn't as fast and flexible in most cases for my uses). Anyway, I can't afford to spend $50 for games; and the prices for productivity packages are well beyond my means. Some of them cost more than my 64C did!

I'd like to add that I think *RUN* is doing a fine job of covering the C-64/128, and you can be assured that I'll be reading as long as you keep writing. Nothing makes my day like finding a copy in the mailbox!

—D. DAYTON LIVINGSTON
HOLBROOK, AZ

WANTS MORE GAMES

I hope the C-64 is around for a long time. It's a great home computer, plus I love the game aspect. Now that you're the only C-64/128 magazine, I hope you'll publish more games for these machines.

—MARY TRIMPER
BUFFALO, NY

Game play has come a long way since the ►

How to build a high-paying career, even a business of your own, in computer programming.

RICK BRUSH,
NRI PROGRAMMER/ANALYST

Start with training that gives you hands-on programming experience—at home and at your own pace. Training that begins with BASIC, then continues with Pascal, C, and COBOL—today's hottest computer languages. Training that even includes a powerful IBM-compatible computer, modem, and programming software you keep.

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You get the experience and the know-how, the computer and the software to get to the heart of *every* programming problem, design imaginative solutions, then use your choice of four key computer languages to build original, working programs.

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early days of Commodore computing. Today's games are much more complex, as well as challenging and entertaining, than they were a few years ago. We're pleased to see that major software companies continue to develop entertainment programs for the C-64/128. Rest assured that RUN, *likewise, will continue to publish games for your system.*

—EDITORS

RUN's USERS' GROUP LIST

Thank you for your prompt response to our request for a listing of Commodore users' groups. It will be most helpful in expanding our newsletter exchange program.

Although the Harrisburg Area Computer Group is an authorized Commodore users' group, our requests to Commodore Business Machines for a users' group listing have fallen on deaf ears. But we have come to expect such service.

—PHILIP ANDERSON
HARRISBURG, PA

Anyone interested in receiving a copy of RUN*'s users' group list can send in a self-addressed, stamped, business-size envelope to: Users' Group Listing, RUN Magazine, 80 Elm St., Peterborough, NH 03458.*

—EDITORS

RUN TERM AGGRAVATION

I'm using your fine terminal program, RUN Term 128 (January 1988), and for the most part, I like it very much. It has one flaw, however, that aggravates me: It defaults to 300 baud. While it's easy to reset the baud rate to 1200, I often forget to do so until I'm online. Is there some way I can change the default to 1200?

—ROBERT M. MAYO
BATON ROUGE, LA

A later version of RUN Term 128, published on RUN*'s Super Starter Pak and RUN Works disks, contains a file called Configure, which, when the program is activated, configures it with your desired baud rate and other settings. Unfortunately, the Configure program is not compatible with your version of RUN Term 128.*

—EDITORS

ANOTHER VOTE

I know things are shaky on the Commodore 64/128 front, especially among the magazines. All seem to be either folding or moving on to cover 16/32-bit machines. That's too bad. I appreciate your hanging on. I'm voting for you, as I hope others do, with a year's subscription. Hope you're here next year so I can renew.

I know the Commodore is looked at as a game machine, but with GEOS, it is a very powerful machine, and can do everything around the house I need. Please increase your coverage of GEOS.

—DONALD J. STEVENSON
FT. KNOX, KY ■

A CALL TO READERS

This page is your stage, so stand up and say a few words. Extend praise, air grievances or offer hands-on advice and information.

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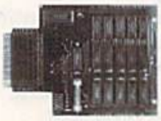
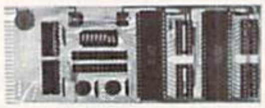


80-line Simplified Digital I/O Board with ROM cartridge socket
Model SS100 Plus $139. Additional $129.



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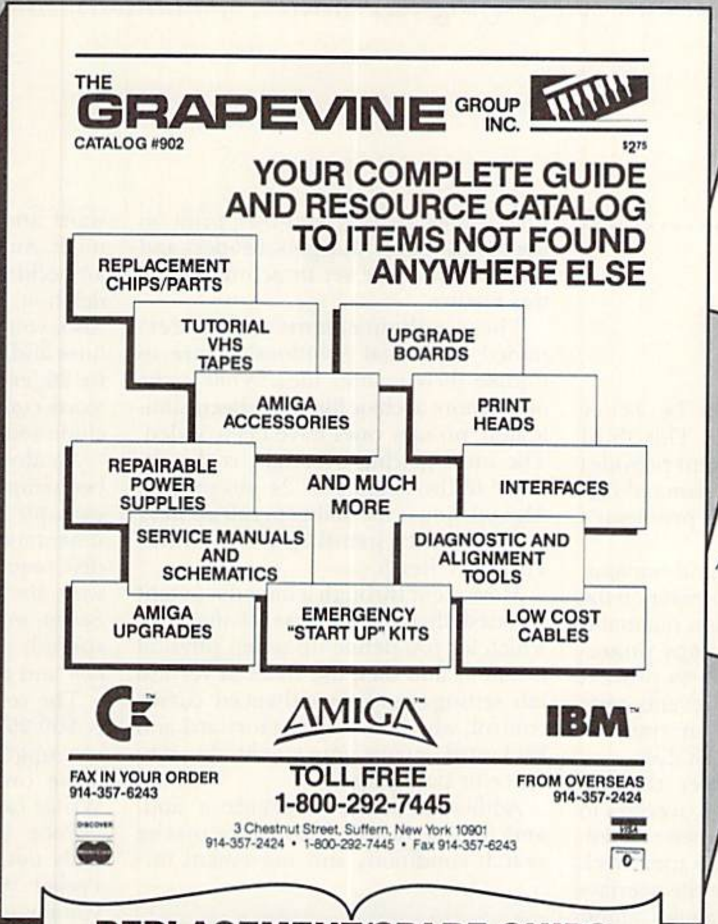

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SOFTWARE GALLERY

There promises to be something for everyone as we begin a new year with reviews of a C-64/128 word processor, role-playing adventures, simulations, shoot-'em-ups and more!

By BETH S. JALA

POCKET WRITER 3 C

This Upgrade Turns Out to Be A Letdown

Pocket Writer 3 would be better named Pocket Writer 2.5. This third offering from Digital Solutions provides changes which, while interesting, do little to improve the word processor's overall performance.

Pocket Writer has been, and remains, the most intuitive word processor on the market. Since the instruction manual is nearly superfluous, heavy copy protection has been the only way to prevent mass pirating, but it also prevents owners from making backups or transferring the program to 3½-inch disks.

Pocket Writer 3 is larger than its predecessors and now uses overlays to store information, which, when needed, is read into memory. C-128 users with a RAM expander can store the overlays in the RAM disk, resulting in almost seamless access.

The 64 version of Pocket Writer 3 does not recognize RAM expanders. C-64 users, as well as 128 users who do not have a RAM expansion unit, must either copy the overlays onto the work disk or put up with disk swapping when moving from one function to another, such as editing to printing.

New to Pocket Writer is a multi-column feature that lets you place up to four columns side by side on a single sheet of paper. You cannot see the columns until you print them. On the screen they appear as one long, single strip. Letters, from a to d, indicate where column breaks will occur. This defeats Pocket Writer's greatest asset: a true "what you see is what you get" (WYSIWYG) feature.

Duplex printing, Digital Solutions' name for printing on both sides of the paper, is available to Pocket Writer 3 users. Even-numbered pages are printed on one side of the paper, odd on the other. You must print one side of the paper, remove it from the printer, turn it over, reinsert and then print on the opposite side. Margins, headers and footers can all be set to accommodate this feature.

These enhancements are undermined by Digital Solutions' failure to update their printer files. While some of the more archaic files have been eliminated, no new ones have been added. The most glaring oversight is the absence of the ubiquitous 24 pin printer. Also missing is the ability to call up near letter quality printing from within Pocket Writer 3.

Movement through a long document is eased through the use of markers, which let you define up to ten physical locations and then use them as vertical tab settings, and an enhanced cursor control, which now allows forward and backward cursor movement, by sentence or paragraph.

Additional features include a find-and-replace function for more precise search conditions and movement forward and backward through a document. An undo feature lets you recover an accidental character, line or range deletion, if you catch it immediately. Also, you can enhance text by creating lines and boxes, and you can define up to 26 expanded macros. Finally, the word count has been increased to include sentences and paragraphs.

An abysmal spelling checker has not been improved in this new version. For example, an eight-block, 275-word documentation file on the Pocket Writer disk requires 50 seconds to check, even with the dictionary loaded in RAM. Seven words falsely came up as misspelled, including, *accomplish*, *justification* and *you've*.

The retail price for Pocket Writer 3 is $69.95. Owners of Pocket Writer 2 can upgrade to version 3 for $29.95, while owners of the original Pocket Writer can do so for $39.95.

Poor spell checking coupled with truly out of date printer files prevent Pocket Writer 3 from being a frontrunner in the word processor sweepstakes. Owners of Pocket Writer 2 should question whether the additional features are worth the $30 upgrade fee. First-time buyers might wish to wait for the inevitable discounting of Pocket Writer 2 after version 3 hits the market. Dollar for dollar, it might prove a better value. *(Digital Solutions, PO Box 345, Station A, Willowdale, Ontario M2N 5S9. C-64/128.)*

—MICHAEL CAVANAUGH
LEVITTOWN, PA

REPORT CARD

A Superb!
An exceptional program that outshines all others.

B Good.
One of the better programs available in its category. A worthy addition to your software library.

C Average.
Lives up to its billing. No major hassles or disappointments here.

D Poor.
This program has some problems. There are better on the market.

E Failure.
Many problems; should be deep-sixed!

BLOOD MONEY .... A–

Here's a Fresh Challenge for Arcade Veterans

The title of this game may lead you to believe that it's some sort of mystery game. It's actually a science fiction shoot-'em-up that has much to offer arcade addicts.

The program is divided into four sec- ►

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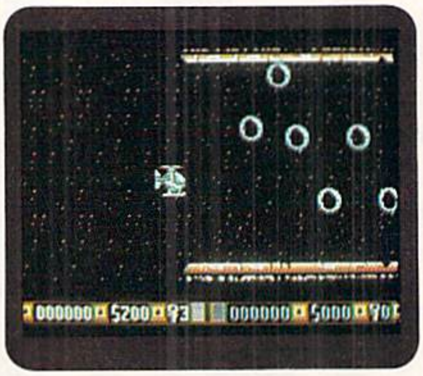
tions. In the first, you—either alone or with a friend—use a joystick to pilot a helicopter gunship on an alien planet called Gibba. Here you try to survive dogfights with hordes of flying enemies while passing through terrain that bristles with floor- and ceiling-mounted antiaircraft batteries. Hits from enemy fire weaken your chopper and will eventually take away one of the four game lives that you begin with.



Blood Money gets high marks for originality and fun.

The second phase puts you in a submarine that explores a colorful and hazardous underwater world. You don a jetpack in the third level as you battle still more foes. If you survive, you get to test your mettle in the fourth scenario, a planet with the fitting name of Snuff.

A player scores points in Blood Money by blasting enemies. You can earn cash by touching coins that materialize when certain foes are destroyed. These funds, which add some mental challenge to the game, let you advance to higher levels, purchase extra lives and upgrade both your weapons and the propulsion systems of your ships.

Be advised that play is quite difficult, and many of your early games will probably be brief. Also, expect a period of adjustment before feeling comfortable with the mechanics, which feature movement that is much slower than that of most other arcade games.

But Blood Money does have rewards for those who will invest the time needed to learn and appreciate it. Most impressive is the originality of the intriguing dangers that confront you during journeys through the four worlds. The option of two-player simultaneous play is another major attraction, and the software includes high quality graphics and sound effects.

While not for everyone, Blood Money will be thoroughly enjoyed by certain players, namely the many veteran gamers who are always looking for a fresh and engrossing adventure in an outer space setting. *(Psygnosis, PO Box 483, Addison, IL 60101. C-64/$29.99.)*

—Walt Latocha
Oak Park, IL

Wings of Fury .... C+

Flight Fans Will Fancy This WWII Action Game

As a Navy pilot flying an F6F Hellcat in Wings of Fury, you must protect a damaged aircraft carrier from enemy bombers. If you're up to the challenge, you'll be rewarded with battlefield promotions. If not, then get ready to taste salt water.

Before taking off, you must select a rank ranging from midshipman to captain. Each rank provides a set of missions more difficult than the previous one. Accurate timing is necessary for destroying island installations and for sinking ships. For downing hostile planes, expert maneuvering and lucky shooting are needed. Knowing when to return to your carrier to repair, refuel and rearm your Hellcat requires sound judgment.

Your F6F is capable of unlimited machine gun fire. In addition, before takeoff, you may choose to carry bombs, rockets or torpedoes.

The simplicity of using the Hellcat's control panel for taking off, flying and turning around in mid-air indicates that this isn't a serious flight simulator. Although landing requires some finesse, after a few tries, you'll have it mastered.

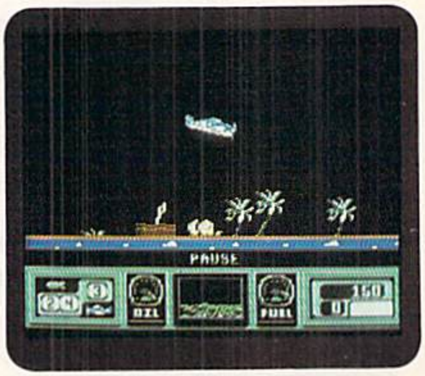
Positioned in the bottom quarter of the screen, the control panel gauges display the number of Hellcats remaining, the amount and type of weapons you are carrying, oil pressure and fuel levels, the score and your number of kills. A 3-D view is provided to help you judge distances between your craft and oncoming targets or your carrier.

Being able to save your rank and high scores to disk and to select your set of missions compensate somewhat for the lack of a save game feature.

Disappointingly, the documentation carefully avoids in-depth information about the various craft and their use in the Pacific war. By eliminating all reference to the Japanese, historical fact is subordinated to a desire to avoid controversy.

Sound effects are realistic, and the horizontally-scrolling graphics and animation are impressive. From the sleekness of the carrier to the gracefulness of the airplanes, every detail is carefully rendered.

As a flight-oriented action game, Wings of Fury should find a devoted audience. WWII aircraft enthusiasts wanting accurate technical detail and historical background should save their money. *(Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. C-64/ $29.95.)*



Wings of Fury puts you in a Navy plane cockpit over the Pacific in WWII.

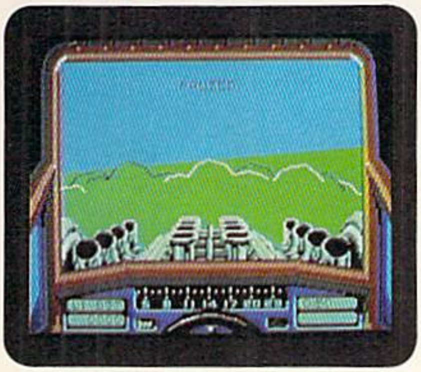
—Len Poggiali
Syracuse, NY

Stunt Track Racer .... A

Go, Speed Racer!

Seated low on the road, you can almost feel the gritty pulse of the revving engine up your spine. You press the joystick forward and accelerate, devouring the track in your path. Up ahead, the fast-approaching ground pitches into an elevated 60-degree curve winding right, left, right. Centrifugal force propels you safely over this gravity pit, but the next hurdle weakens your resolve. The small hairs on the back of your neck bristle with terror as you dive into midair toward the other half of the track. Oh no—too slow! Your car bounces off the track supports and sends you careening into the dirt below. Your last view before hitting the sand is a gut-wrenching kaleidoscope of clouds and sky. Thick billowing smoke envelopes you before you black out. Soon a crane lifts you up and deposits you back on the track again. The race has just begun!

Stunt Track Racer should thrill the universal racing fan, whatever make or model. Strapped into a low-slung, custom-built dragster, your timing and precision skills must be handled like a pro. Pressing the joystick forward increases your speed; pulling it back slows you down. Pushing it left or right aims you at either side of the road. Hitting the joystick button boosts your power considerably, but your fuel is limited, so don't overdo it.



The view from behind the wheel during a break in Stunt Track Racer action.

Graphics and scenery combine with realistic animation that will swirl the heads of motion aficionados. It's fun to overtake and pass other drivers on the road. The view you have is of the back of each car getting bigger as you get closer. If you get too close, however, your rival blocks your vision of the track. Best to pass quickly!

To win a race, you must beat your computer rivals. The game has four divisions, each containing two different tracks.

Stunt Track Racer's special features let you record your scores, pause a game, practice, save and restore a game, and compete with other players against the computer. The dashboard indicates your velocity, lap time, number of laps completed, and the amount of boosting time remaining. Last but not least, the manual offers easy instructions and a superbly illustrated account of the history of motor racing.

You'll "lap up" this motion experience! *(MicroPlay; distributed by MicroProse Software, 180 Lakefront Drive, Hunt Valley, MD 21030. C-64/$29.95.)*

—JOHN DIPRETE
CRANSTON, RI

DIE HARD .... C–

Here's a Game That Tries Hard, But Disappoints

Die Hard is a search-and-destroy mission based on the movie of the same name. Your gun-toting hero must roam through a building that's been taken over by terrorists who've stolen $600 million in negotiable bonds. The killers also hold your wife hostage and plan to blow up the high rise.

Your goal is to sock and kick around the henchmen and gun down the armed assailants. The floors of this terror-filled building contain a three-dimensional maze of stairwells, rooms and criss-crossing corridors; the screen shows a multitude of detailed perspective graphics that include file cabinets, air vents, potted plants, chairs, couches and desks. Wall maps in hallways enable you to calculate quick routes to various destinations.

A nice touch includes finding a radio that lets you eavesdrop on your wife's kidnapper and his gang.

The trouble comes in actually playing the game. The three-dimensional perspective is wonderful, but the main character's movements aren't in sync. If you move your hero to the screen's foreground or background, his feet move sideways, and his body doesn't turn either toward or away from you. You're left with a permanent side view of your alter ego. Animation is smooth, but when you enter a corridor or move into another room, the scene abruptly changes to accommodate this new situation.

I've saved my worst criticism for last: Your hero is easy to kill, but hard to resuscitate. Each time you start a game, it takes almost five minutes to reboot the program. Software designers should know by now that it's foolish to combine a hero's high mortality rate with a slow-loading program.

Die Hard has great potential, but skimpy playing dynamics. *(Activision; distributed by Mediagenic, 3885 Bohannon Drive, Menlo Park, CA 94025. C-64/$29.95.)*

—JOHN DIPRETE
CRANSTON, RI

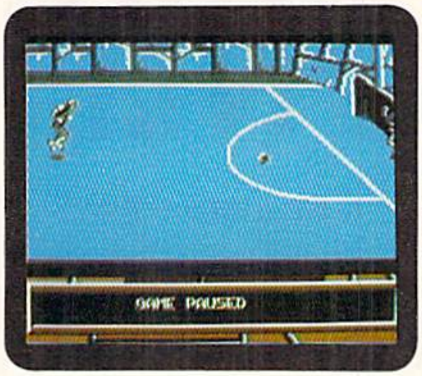
SKATE WARS C

Soccer with a Twist Will Amuse, but Lacks Challenge

If Skate Wars is the sport of the future, then tomorrow's athletes should consider alternative careers.

Essentially a two-on-two soccer-like contest, Skate Wars is played across a horizontally-scrolling field with a net at either end guarded by each team's computer-controlled goalie.

Interspersed throughout the playfield are pits, spiked balls, stone pillars, and so forth, which either disrupt your game or send your striker (ball handler) to an early grave. Fortunately, each team has two subs, who can come in one at a time to replace a fallen comrade.



Skate Wars is soccer action with a slightly sadistic bent.

For every five screens you survive, you are rewarded with an additional replacement. To advance to one of the 50 levels, you or your opponent must score five goals.

Maintaining ball possession while your opponent slams you around, avoiding or jumping over obstacles, shooting effectively and defending your goal can add up to quite a challenge in the two-player game.

The computer doesn't learn by its mistakes or by your successes, so you can use the same strategy time and again and still score. It is incredibly simple, for example, to win nearly every face-off. Although faking out either goalie is a breeze, you wouldn't know it from the way the computer striker shoots. Left alone, it often takes him four or five shots to score.

Since the entire program is stored in memory, the main disk can be removed, making room for your formatted save disk. You can save or restore a game at any point.

The field, the various pitfalls and the players are well drawn, although occasionally a striker loses the bottom half of his body. Animation is smooth and sound effects appropriate.

Skate Wars has enough action and opponent clashes to satisfy most fans of contact sports. Whether there is enough challenge, however, is another matter. *(UBISoft; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$29.95.)*

—LEN POGGIALI
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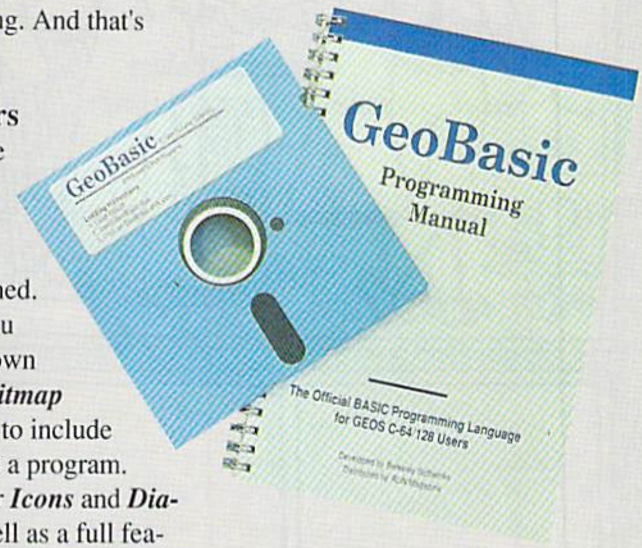
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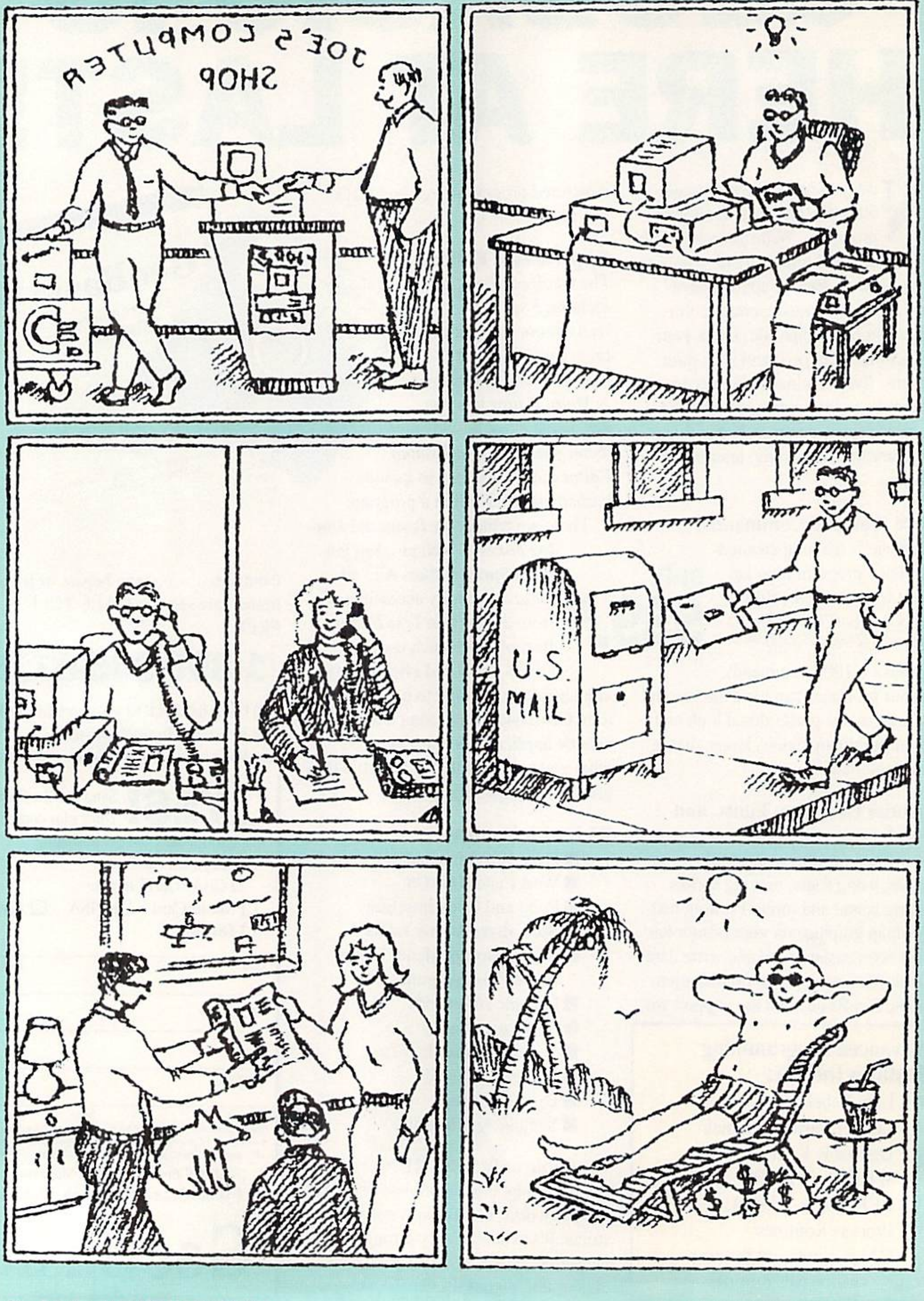
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Confessions of a Programmer for Hire

One of RUN*'s most prolific writers offers tips on getting your programs published.*

◆

By JOHN RYAN

If someone had told me five years ago that I would become a prolific writer and programmer for a national computer magazine, I would have called them crazy. Why? Well, for one, I'm miserable at math and algebra. Aren't all programmers supposed to be math and logic wizards? Secondly, I haven't had one single semester hour in computer science. Isn't it true that the best programmers have degrees in computer science and programming?

The answer to these questions is an unequivocal "no." They represent myths that many hold about programming, myths that have been propagated over the years by those who have "made it," either commercially or in magazines. I don't want to focus on my successes in advising you how to get your work published. I do, however, feel that I can draw on my experience to help improve the chances of any aspiring author. Perhaps this advice will help you avoid some of the pitfalls I've experienced.

FIRST STEPS

There's no trick to getting published—no magic fix, no hocus-pocus. Whether your aim is making a commercial sale or writing for a computer magazine, you have to do your homework.

Doing that homework can be as simple as opening the magazine or studying the product list of a company to see what has been done before. You can't jump blindly into a market and expect to sell your work. Gone are the days when a programmer could bang out some code and then circulate it around to several Commodore-specific computer magazines in the hope of selling it. The years from 1983–1987 were the heady years for Commodore programmers, and there was a niche for any good idea that came along. Now, *RUN* is the only viable national magazine left.

Of course, there are other sources that will publish your program. If your programming skills are good enough, you might contact one of the major software developers (see the accompanying sidebar, "The Great American Program"). GEOS programmers could try *geoWorld Magazine*, which publishes programs on disk as well as in the magazine. And there are disk magazines, such as LoadStar, that might be on the lookout for a program like yours.

Today an author must work harder to produce the quality programs that users demand. While rumors of the C-64's death have been exaggerated, you must research the market first. See what has been done and then decide whether your idea is unique and worthwhile pursuing.

Once you have a program idea, look through the back issues of the magazine you have in mind. See if a similar program has been published in the past two years. If you don't have back issues, then at least try to find the annual issue (probably January) that contains a publisher's index of all the articles and programs published the preceding year. If the program has appeared recently, then consider coming up with a different idea.

But just because a program like yours hasn't been published doesn't automatically assure you a byline. Magazines often plan editorial content—especially features—months in advance. You may also find that a magazine is deluged with, say, game programs and is seeking utilities instead. If you haven't coded the program yet, the best thing to do is to query an editor. A query letter need not be fancy or involved. Clearly explain to the editor what your program or idea is and what makes it unique.

Don't try to dazzle an editor by promising a commercial-quality word processor, database or blast-'em up. Bigger is not necessarily better. In fact, smaller can be better because of the limited size of magazines. *RUN*'s Technical Manager, Tim Walsh, says, "Some folks think a high-tech piece, with a lot of 'gee-whiz' features, will get them published in *RUN*. Many times, it is the small, compact, yet useful applications and utilities that catch our attention."

Does this mean that the days of blockbuster type-in programs are gone? "Absolutely not," Walsh continues. "*RUN* will consider any program. However, games must be unique, and utilities and applications must be truly useful. Larger programs can always be published in *RUN*'s companion disk, ReRUN."

If you've already written a program, you can skip the query and send it to a magazine unsolicited. Many quality programs come in "over the transom," then fall into the "slush pile." *RUN*'s slush pile has diminished over the years. "At one time, we were getting over 100 submissions a week," noted Walsh. "But no more. A good week brings in only a half dozen or so, which actually increases the likelihood of a submission being accepted."

WHICH LANGUAGE?

A well-written Basic program is as apt to get published in a magazine as a program written in machine ►

language. It's often not the language that makes or breaks a program, but the concept and execution of that concept. Every program I've ever submitted was written in machine language, simply because I'm a terrible Basic programmer (having learned machine language first). More importantly, my programs, such as DOS Shell 64, RUN Shell and Islands!, were either graphics or memory intensive, requiring blinding speed to make them palatable.

Games are perhaps the most difficult programs to sell today, because many of the best ideas have already been coded. Moreover, readers are less apt to type in a game when they can download one from a BBS or buy one off the shelf for $10. I've gotten around this by writing games that are innovative, fast-playing and pleasing to look at. If you follow these guidelines, you'll find a receptive audience in the editorial offices. If you're going to submit a game—especially in Basic—make sure it's not sluggish and unresponsive. A reader, and therefore an editor, won't tolerate this for long before tossing the program aside.

So, if you know machine language, you may be a step ahead of the ballgame. At the same time, Basic programs will continue to make up the majority of programs that are published in *RUN*.

THE PROGRAM

Sometimes programmers can't see the program for the code. They get this nifty, high-tech idea, spend several weeks coding it, and send it to a magazine, expecting it to be snapped up with a high-priced contract. Then they don't understand when their beloved program is rejected. Tim Walsh explains: "A lot of 'wannabe' programmers don't understand that a good program is not just sophisticated. There are other things to consider. Some people send in big, monstrous programs full of high-end features, only to have them turned down because of other factors."

What are those other factors? Any program you submit should be absolutely bug-free. There's nothing more frustrating to an editor than receiving a promising program, only to find that it doesn't work as advertised or, worse yet, fails to boot entirely. If you submit a program with bugs, you can expect a polite rejection slip or, at the most, a letter explaining what needs to be fixed before the program can be reconsidered.

It's not enough for you to play-test your program. After staring at the same code week after week, you can easily overlook problems. You must have other people test your work thoroughly, preferably people who are computer knowledgeable or who have an interest in the type of program you've written. They know what the minimum features of that type of program are.

Documentation for your program can be as important as the program itself—especially when an editor or publisher is on the fence whether to accept or reject it. If your instructions are vague and confusing, or if they ramble on for 10 or 12 pages, you can look forward to a lot of rewriting (or the editor will have to do it). Make your instructions concise, and, whenever possible, include them in the program itself. Both the readers and editors will love you for it.

Also, pay strict attention to your user interface, the method by which users navigate around your program. There's nothing worse than a program with a clumsy interface. A well-written program will make any keyboard codes as intuitive as possible (L for load or S for save, for instance). Additionally, if you use the F1 key to exit a particular function, use the F1 key to exit other functions as well. It's little things like this that make an interface great.

Be wary, too, of requiring additional equipment, such as a mouse, a RAM cartridge, a printer or 64K VDC chips. You want to appeal to the majority of Commodore users.

Finally, don't send in a program than spans both sides of three floppy disks. As I mentioned, there's a limit to what can fit in a magazine, and there's also a limit to what a reader will type in. A large program may be considered for publication in ReRUN (where my very first program, Background Construction Set, ended up).

WHAT TO EXPECT IN RETURN

Don't expect to strike it rich selling your work to a magazine. Software houses (see the sidebar) offer better money, but your chances of hitting the Pennsylvania lottery are sometimes better than selling a million copies of a game.

So what can you expect? "It varies from program to program, obviously," says Walsh. "Payment is usually

Do's and Don'ts of Getting Published

Do debug your program thoroughly before submission.

Do keep your instructions concise and easy to read.

Do include a self-addressed stamped mailer if you want your submission returned.

Do write to get the magazine's writer's guidelines, and include an SASE.

Do be persistent if your program is rejected. Write the magazine and ask the editors why it was rejected. Or, send in another program.

Do be committed. Commitment and reliability mean a great deal to an editor. Editors often come up with their own ideas for programs and assign them to authors who they know will get the work done—authors who consistently return quality work and meet their deadlines.

Don't repeatedly call an editor with ideas unless you're on a working basis with that editor.

Don't submit unsolicited reviews; they're rarely accepted. Reviews are assigned by the editors. After selling a program or two, you can ask to write reviews.

Don't submit public domain programs done by other authors or routines taken from commercial programs.

Don't submit the same program to two magazines at once (called simultaneous submissions).

Don't call an editor every week to ask about your submission. It may take 30 to 60 days for a magazine to make a decision about your program.—JR based on the quality and sophistication of the program, as well as whether you're an imaginative programmer. There is money to be made. You can expect, if you become prolific, to make enough additional income to buy those things you would normally have to put off—things like a second disk drive or a new printer."

Selling programs to a magazine won't make you rich, but quality programs can garner a nice little check. My success at programming has enabled me to branch into software reviewing and feature writing, which often entail less sweat for better wages. Establishing yourself at a magazine like *RUN* can give you the credentials to work for other magazines, as well. Prolific freelance writers and programmers can expect to earn anywhere from $3000 to $7000 a year.

When a program is accepted, you'll be notified by mail—or phone if the editor absolutely loves it. You'll also receive a contract. *RUN*, like most magazines, offers a "work-for-hire" contract that buys all rights to your program. In return for sole ownership, *RUN* will pay you on publication and offer royalties based on the number of ReRUN disks sold for that issue of the magazine.

It normally takes three to six months from the time a program is accepted to the time it actually appears in print (sometimes it can even take longer if the magazine is backlogged with unpublished programs). Writers live in a time warp. For example, in October, I was getting paid for work I accomplished in June and July!

As I've mentioned, you don't have to be a programming whiz or write long programs to get published. Just ask Richard Penn of Montreal, Canada. Richard is *RUN*'s most prolific Magic column contributor, having sent in dozens of Magic tricks over the years. Since most of his work has been accepted, Richard has received considerable reward for his efforts.

So, whether your program is 10K or four lines long, you may see your name in print—if you consider the guidelines I've discussed, and if you have an idea whose time has come. ■

John Ryan, one of RUN*'s contributing editors, is a writer, programmer, co-owner of a video production company and a full-time air traffic control instructor.*

The Great American Program

IF YOU BECOME an established magazine author, where do you go from there? Every programmer dreams of writing a software masterpiece to sell commercially. While there's a thrill in seeing your byline in a magazine, nothing could compare to receiving the first copy of your game with the name Accolade, Electronic Arts or Mediagenic emblazoned under shrink wrap.

Coming up with a fresh and innovative idea for a game, and then translating that idea into code, is only half the battle. You'll also face the same tribulation today's novelists face: finding a publisher.

In 1984, Al Miller and Bob Whitehead, co-owners of a promising young company named Activision, decided to leave and form another company—one that would produce computer software on disk instead of the cartridge-based software that had been the bread and butter of Activision. In Santa Clara County, the heart of California's Silicon Valley, they founded Accolade. From those humble beginnings, Accolade has become one of the world's leading publishers and distributors of computer software. Today, it's a multimillion-dollar business with no direction to go but up—and they're looking for you, the next million-seller software author.

Sheldon Safir is the manager of product development for Accolade, and he's a man always on the lookout for a promising program. "We'll look at anything," Safir says nonchalantly, "whether it's an idea on paper or a finished product.

"We do use in-house developers, but we also work with authors outside the company."

But before you shove your homespun football game into a mailer and send it off, there are several things to consider. Foremost are many of the concepts regarding selling to a magazine that I covered in the article. Secondly, you must write to Accolade—or any other software publisher—and ask to receive their product kit. It details the steps you must take to submit your idea or program to the company. It also tells how long you must wait before receiving a reply.

Again, the submission must be original, of commercial quality and have the potential to attract high sales. "We rarely consider submissions that don't have the potential to sell at least 50,000 copies," Safir informed me. "And we consider 50,000 a minimal hit."

To have the best chance of selling, a game program must also be written in a language that's easily transported to other platforms. This means writing it in C, or even assembly language. Basic programs just don't have the horsepower to push a graphics-intensive game, and that includes compiled Basic. "We'll consider compiled Basic submissions," Safir assured, "but we prefer C."

Safir still sees the C-64 as a major player in the market, but more in the market across the Atlantic.

"Right now, Commodore is probably our third most popular platform in the U.S., with 75 percent of sales being PC-based. Commodore is actually bigger for us in Europe. But the problem is, most European sales are still cassette-based."

What will you get after receiving your kit, bundling off your submission and then enduring the long wait for a reply? Well, to begin with, you'll certainly be notified of Accolade's opinion. If the product is accepted, you'll be assigned a producer from the company. This producer will act as your editor, assigning you deadlines for achieving certain milestones. The producer will supervise the project from beginning to end.

More importantly, you'll receive a contract—starting at 8 percent of wholesale sales and ranging to 12 percent, maybe more. You'll also receive an advance against your royalties, which will vary from contract to contract. Even at 8 percent, assuming the wholesale cost of each unit is $15, a minimal sale of 50,000 units would bring you a nice fat check for $60,000! If you have a best-seller, then you can double or triple that amount. Not bad for six to eight months of work, eh?—JR

Breaking the Basic Speed Limit

Supercharge your Basic programs with these seven simple secrets.

◇

By STEPHEN DIRSCHAUER

We all think of Basic as slow, and, indeed, a Basic program will always lag behind its machine language equivalent. However, with the help of the seven simple tips in this article, you can make Basic faster than you'd think. Apply these tips as often as possible, and you can really turbocharge a program. A single application may save only a second, but the seconds will add up!

1. Place frequently used subroutines at the beginning of a program. To understand why, it's necessary to know how the GoTo and GoSub commands work. At one of these commands, Basic's first step is to compare the current line number with the destination line number. If the latter is greater, Basic starts searching for it from the current location. Otherwise, it goes to the very beginning of the program and searches through memory until it finds the desired line. Since you probably jump to a given subroutine from various spots in a program, obviously the best place for the routine is near the beginning of the program.

2. When using large arrays, initialize all nonarray variables at the start of execution. Perhaps you've noticed that programs using large variable arrays occasionally pause for several seconds during the first few minutes of execution. One of these pauses occurs each time a new single-element (nonarray) variable is used because, when Basic creates a single-element variable, it adds a few bytes of information (including type, size and location in memory) to a table for later reference. Another table—for array variables—resides directly below the single-element table in memory. To make space for the new entry, Basic must move the array table further down, which, depending on the size of the table, may take up to several seconds.

You can avoid this problem by defining all single-element variables at the beginning of a program—before you use any arrays. If a variable's value won't be known until later, you can set it to zero, because modifying an existing variable doesn't require moving the array table.

A quick way to do this is with the DIM command, as if dimensioning an array, but omitting the array size in brackets—like this:

```
DIM AB,CD%,EF$
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Here, Basic creates three variables, setting the numeric variables to zero and the ►

ILLUSTRATION BY NELLE DAVIS

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string to a null (making an empty string).

3. Put only absolutely essential code in a main loop. You can realize great savings in speed by purging a program's main loop of any code that doesn't have to be there, relocating it and leaving only the bare essentials. Here's an example: Some arcade games redisplay a player's score each time through the main loop. However, the score usually needs to be printed again only when it changes, since the old value remains on the screen. Clearly, then, the place for the score-printing routine isn't in the main loop, but with the code—probably a subroutine—that actually changes the score.

4. Use variables instead of literal numbers. Variables, such as AD and EQ%, are much faster than literal numbers, such as 42922, because Basic must read literal numbers digit by digit and convert them to a format it can use, while variables are stored in a format Basic can automatically read and use. For instance, the following short program copies the C-64's character set from ROM to RAM, so it can be modified. Similar routines can be found in many programs:

```
10 POKE56334,PEEK(56334)AND254:
   POKE1,PEEK(1)AND251
20 FORT=0TO2047: POKE12288+T,PEEK
   (53248+T):NEXT
30 POKE1,PEEK(1)OR4: POKE56334,
   PEEK(56334)OR1
```

By my watch, this routine finishes in just over 30 seconds, but when two of the literal numbers are assigned to variables:

```
10 A=12288:B=53248
20 POKE56334,PEEK(56334)AND254:
   POKE1,PEEK(1)AND251
30 FORT=0TO2047:POKEA+T,PEEK
   (B+T):NEXT
40 POKE1,PEEK(1)OR4: POKE56334,
   PEEK(56334)OR1
```

the routine is more than 100 percent faster, running in about 12 seconds.

But wait a minute—wouldn't using variables for the other literal numbers (for example, 56334) speed things up even more? Not really. Variables are faster, but the acceleration is unnoticeable unless they're used more than once or twice. In our example, they're each accessed more than 2000 times.

5. Use REM statements sparingly, if at all. Although they make programs easier to read and study, REM statements certainly don't make them faster. When Basic encounters a REM, it must recognize the command and jump to the next line, taking considerable time.

If you must use REM statements, at least avoid placing them in the main loop and at the start of the program. Put them someplace where they won't be read over and over; the very end of the program is ideal. You could also make two versions of a program—one containing the REMs for making program changes or as a reference, and one without the REMs for regular use.

6. Replace solitary zeroes with periods. Basic interprets solitary zeroes and periods the same way, but recognizes the periods much faster. As an example, you could change POKE 53280,0 to POKE 53280,. for more speed. This works only with solitary zeros. Basic would interpret POKE 5328.,. as POKE 5328.,0

7. Don't use any unnecessary code. Many programs contain code that's just not needed. The INT function is a particular culprit. You'll often see a line such as POKE 49152,INT(A), where the call to INT is useless. Basic commands accept noninteger values, although they may use only the part to the left of the decimal place. INT isn't the only offender. Try to detect any such code in your own programs.

A FEW OTHER POINTERS

What if you've dutifully used as many of these tips as possible, and your program is *still* too slow? Don't worry—there are a few other options available:

Use machine language. There's probably no need to rewrite the entire program—just some of the time-intensive routines. You can write your own or perhaps use routines published in *RUN*'s Magic column. What's more, many Basic listings published in *RUN* include machine language routines that you can adopt into your own programs.

Compile the program. Commodore Basic is an "interpreted" language. That is, the Basic interpreter reads each line and more or less does the equivalent in machine language. Compilers like Basic 64 (Abacus, 5320 52nd St. SE, Grand Rapids, MI 49508; 616-241-5510; $39.95) and Basic 128 (also from Abacus, $59.95) can convert your Basic program into a machine language version that doesn't need to be interpreted. Compiled programs can run up to 35 times faster than interpreted programs. Many compilers have a P-code, or pseudocode, option, which isn't as fast as straight machine language, but is more memory efficient.

Try faster algorithms. Analyze important routines to see if you can save any steps.

Use all these tips to break the Basic speed limit. You'll be glad you did! ■

Stephen Dirschauer, a programming hot rodder, enjoys the open road and racing his Commodore system at maximum speed.

Basic Speed Myths Debunked

HERE ARE THREE POPULAR MYTHS about Basic program speed that *will not* make your programs run faster:

1. Programs with low line numbers run faster than those with high line numbers. The reasoning here is that low line numbers (such as 10 and 20) take up less space in memory than high line numbers (such as 10000 and 20000), so it takes the Basic interpreter less time to read them. If line numbers were stored digit by digit—10 taking two bytes and 100 three—this would probably be true. However, all line numbers are stored in two bytes, so Basic takes the same length of time to read any of them.

2. Integer variables are faster than floating point variables. This does sound logical. After all, integer variables, which represent numbers with no decimal point or decimal places, are only two bytes long, while floating point variables, representing numbers with a decimal point and decimal places, occupy five bytes. Basic, then, should be able to manipulate integer variables in less time. Actually, the opposite is true—floating point variables are much faster. That's because all the Commodore Basics have routines—add, subtract, and so on—for using floating point variables, but not one routine for performing operations on integers. When an integer variable must be used, Basic changes it to a floating point format, then back again afterward. The conversions account for the slowdown.

3. Variables with names that appear early in the alphabet are faster than others. With some older Basics, this is true, since variables are stored alphabetically, and A is reached faster than Z. Commodore Basic, however, stores variables in the order they are created, so the first variable declared can be accessed faster than the last. The specific difference in time depends on the number of variables in memory.

—SD

Envelope Addresser

The function keys are all you need to make your C-64 quickly address envelopes.

◇

By KEVIN McDONALD

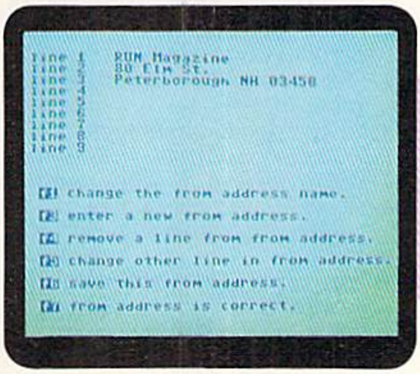
Envelope Addresser is just the program you need when it's time to get your mail out. This nifty little program lets you print addresses—both forwarded (To) and return (From) addresses—on standard letter and legal envelopes just by using the C-64's function keys. Your return address is saved in a sequential file on disk, then, each time Envelope Addresser runs, it's loaded automatically.

Type in Envelope Addresser from Listing 1, using *RUN*'s Checksum program to detect any typing errors, and save it under your choice of filename. When you run the program for the first time, the message "Loading From Address" flashes across the screen. Then, because there is no From address yet, the "Entering a New From Address" screen follows.

Enter your From address one line at a time, pressing the return key at the end of each line. The first character on each line is a set of quotation marks provided by the program; it's under the cursor when the line first appears. Press the cursor-right key once before typing any line that contains a comma or other punctuation mark. If you don't, you may get an Extra Ignored error message and lose everything typed in the line after the punctuation mark. Don't worry if you forget, though—the line can be corrected after you finish entering the rest of the address. You can enter a blank line by tapping the return key when the line first appears. To end the address, type £ as the first character of the line following the address and then press the return key.

THE MENUS

There are three Envelope Addresser menus. All menu items are selected by pressing the appropriate function key.



```
line 1   RUN Magazine
line 2   80 Elm St.
line 3   Peterborough NH 03458
line 4
line 5
line 6
line 7
line 8
line 9

F1 change the from address name.
F3 enter a new from address.
F4 remove a line from from address.
F5 change other line in from address.
F6 save this from address.
F7 from address is correct.
```

Rapidly produce addresses for your envelopes with Envelope Addresser.

The From Address menu: F1 lets you quickly change the first line of the From address—useful when several people have the same address. F2 inserts a new line into the address; F3 enters a completely new address; F4 deletes a line from the address; and F5 makes corrections to any line in the address. F6 is for saving the From address, as it appears on the screen, to disk. Save the From address the first time you enter it and any time you make permanent changes to it. F7 lets you access the To Address menu.

The To Address menu: The F2, F3, F4 and F5 keys are the same as in the From Address menu, while F1 and F6 are no longer available. F7 advances to envelope printing.

To print, put an envelope in the printer and press any key. When printing is done, the Print Options menu appears.

The Print Options menu: F1 prints another envelope; F3 lets you make corrections in both addresses; F5 enters a new To address; and F7 exits to Basic.

Now, with this program—and a little help from your friendly postman—your mail is sure to be delivered correctly! Ⓡ

Kevin McDonald is a self-employed computer specialist. In his spare time he enjoys programming on his C-64.

Listing 1. Envelope Addresser program. (Available on ReRUN disk. See order card facing page 40.)

```
10 REM ENVELOPE ADDRESSER - KEV
   IN MCDONALD           :REM*149
20 DIMA$(9),R$(9):A=0:R=1:C$=CH
   R$(18):HR$=CHR$(146)   :REM*0
30 PRINT"{SHFT CLR}"CHR$(14)CHR
   $(8)"{4 CRSR DNs} LOADING FR
   OM ADDRESS."           :REM*22
40 OPEN2,8,2,"0:EA.FROM,S,W"
                         :REM*171
50 PRINT#2,R:PRINT#2,"{LB.}":PR
   INT#2:CLOSE2          :REM*160
60 OPEN2,8,2,"0:EA.FROM,S,R"
                         :REM*126
70 INPUT#2,R:INPUT#2,R$(1):IFR=
   1ANDR$(1)="{LB.}"THENPRINT#2
   :CLOSE2:GOTO330       :REM*227
80 FORX=2TOR:INPUT#2,R$(X):NEXT
   X:PRINT#2:CLOSE2      :REM*181
```

►

RUN it right: **C-64; printer**

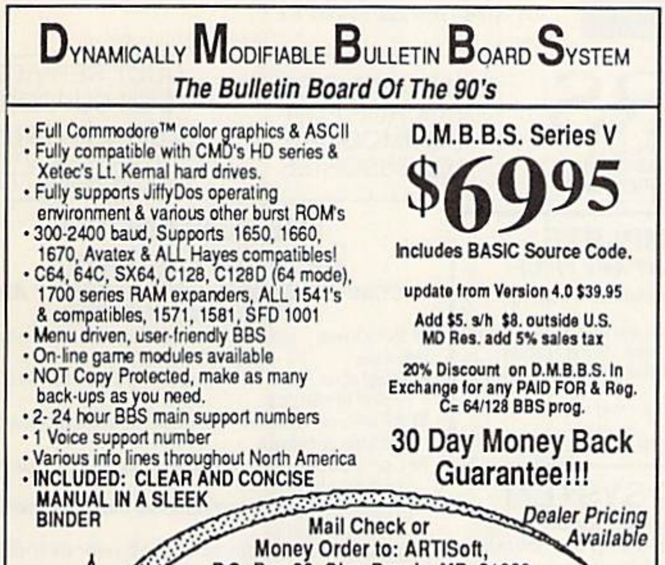
```
90 PRINT"{SHFT CLR}{CRSR DN}"SP
   C(11)"FROM ADDRESS MENU"
                         :REM*250
100 PRINTSPC(11)"{17 COMD Ts}{C
   RSR DN}"              :REM*44
110 FORX=1TOR:PRINT"LINE"X"{2 S
   PACEs}"R$(X):NEXT:PRINT"{2
   CRSR DNs}"            :REM*158
120 PRINT" "C$"F1"HR$" CHANGE T
   HE FROM ADDRESS NAME.{CRSR
   DN}"                  :REM*172
130 IFR<9THENPRINT" "C$"F2"HR$"
    ADD A LINE TO THE FROM ADD
   RESS.{CRSR DN}"       :REM*10
140 PRINT" "C$"F3"HR$" ENTER A
   NEW FROM ADDRESS.{CRSR DN}"
                         :REM*123
150 PRINT" "C$"F4"HR$" REMOVE A
    LINE FROM FROM ADDRESS.{CR
   SR DN}"               :REM*223
160 PRINT" "C$"F5"HR$" CHANGE O
   THER LINE IN FROM ADDRESS.{
   CRSR DN}"             :REM*138
170 PRINT" "C$"F6"HR$" SAVE THI
   S FROM ADDRESS.{CRSR DN}"
                         :REM*37
180 PRINT" "C$"F7"HR$" FROM ADD
   RESS IS CORRECT."     :REM*252
190 GETF$:IFF$=""THEN190
                         :REM*181
200 IF(F$<"{FUNCT 1}")OR(F$>"{F
   UNCT 6}")THEN190      :REM*227
210 IF(R>=9)AND(F$="{FUNCT 2}")
   THEN190               :REM*99
220 IFF$="{FUNCT 7}"THEN480
                         :REM*46
230 IFF$="{FUNCT 1}"THEN290
                         :REM*62
240 IFF$="{FUNCT 3}"THEN330
                         :REM*29
250 IFF$="{FUNCT 5}"THEN420
                         :REM*2
260 IFF$="{FUNCT 2}"THEN1030
                         :REM*72
270 IFF$="{FUNCT 4}"THEN1150
                         :REM*152
280 IFF$="{FUNCT 6}"THEN1250
                         :REM*190
290 PRINT"{SHFT CLR}{3 CRSR DNs
   }":FORX=1TOR:PRINT"LINE"X"{
   2 SPACEs}"R$(X):NEXT
                         :REM*182
300 PRINT"{3 CRSR DNs}{SHFT N}E
   W NAME{2 SPACEs}"CHR$(34)R$
   (1)                   :REM*2
310 IFLEN(R$(1))>=29THENPRINT"{
   CRSR UP}";            :REM*100
320 INPUT"{CRSR UP}{8 CRSR RTs}
   ";R$(1):GOTO90        :REM*31
330 PRINT"{SHFT CLR}{4 CRSR DNs
   } ENTERING A NEW FROM ADDRE
   SS."                  :REM*29
340 PRINT"{2 CRSR DNs}{2 SPACEs
   }"C$" {LB.} "HR$" FINISHED
   ENTERING FROM ADDRESS.{2 CR
   SR DNs}"              :REM*190
350 R=1:FORX=1TO9:R$(X)="":NEXT
                         :REM*193
360 IFR=10THENR=9:GOTO90
```

```
                         :REM*124
370 PRINT"{CRSR DN}ENTER LINE"R
   " "CHR$(34)           :REM*49
380 INPUT"{CRSR UP}{12 CRSR RTs
   }";R$(R)              :REM*145
390 IF(R$(1)="{LB.}")AND(R=1)TH
   ENR$(1)="":GOTO90     :REM*153
400 IFR$(R)="{LB.}"THENR=R-1:GO
   TO90                  :REM*187
410 R=R+1:GOTO360        :REM*78
420 PRINT"{SHFT CLR}{3 CRSR DNs
   }":FORX=1TOR:PRINT"LINE"X"{
   2 SPACEs}"R$(X):NEXT:REM*52
430 INPUT"{3 CRSR DNs}WHICH LIN
   E IS TO BE CHANGED";R1
                         :REM*64
440 IF(R1<1)OR(R1>R)THEN420
                         :REM*143
450 PRINT"{2 CRSR DNs}ENTER LIN
   E "CHR$(34)R$(R1)     :REM*130
460 IFLEN(R$(R1))>=27THENPRINT"
   {CRSR UP}";           :REM*202
470 INPUT"{CRSR UP}{10 CRSR RTs
   }";R$(R1):GOTO90      :REM*116
480 IFA=0THEN650         :REM*48
490 PRINT"{SHFT CLR}{CRSR DN}"S
   PC(12)"TO ADDRESS MENU"
                         :REM*118
500 PRINTSPC(12)"{15 COMD Ts}{C
   RSR DN}"              :REM*150
510 FORX=1TOA:PRINT"LINE"X" "A$
   (X):NEXT:PRINT"{2 CRSR DNs}
   "                     :REM*36
520 IFA<9THENPRINT" "CHR$(18)"F
   2"CHR$(146)" ADD A LINE TO
   THE TO ADDRESS.{CRSR DN}"
                         :REM*180
530 PRINT" "C$"F3"HR$" ENTER A
   NEW TO ADDRESS.{CRSR DN}"
                         :REM*2
540 PRINT" "C$"F4"HR$" REMOVE A
    LINE FROM THE TO ADDRESS.{
   CRSR DN}"             :REM*76
550 PRINT" "C$"F5"HR$" CHANGE A
    LINE IN THE TO ADDRESS.{CR
   SR DN}"               :REM*234
560 PRINT" "C$"F7"HR$" TO ADDRE
   SS IS CORRECT."       :REM*244
570 GETF$:IFF$=""THEN570:REM*29
580 IF(F$<"{FUNCT 3}")OR(F$>"{F
   UNCT 4}")THEN570      :REM*8
590 IF(A>=9)AND(F$="{FUNCT 2}")
   THEN570               :REM*207
600 IFF$="{FUNCT 7}"THEN800
                         :REM*157
610 IFF$="{FUNCT 3}"THEN650
                         :REM*191
620 IFF$="{FUNCT 5}"THEN740
                         :REM*174
630 IFF$="{FUNCT 2}"THEN1090
                         :REM*10
640 IFF$="{FUNCT 4}"THEN1200
                         :REM*204
650 PRINT"{SHFT CLR}{4 CRSR DNs
   } ENTERING NEW TO ADDRESS."
                         :REM*39
660 PRINT"{2 CRSR DNs}{2 SPACEs
   }"CHR$(18)" {LB.} "CHR$(146
   )" FINISHED ENTERING TO ADD
```

```
   RESS.{2 CRSR DNs}" :REM*146
670 A=1:FORX=1TO9:A$(X)="":NEXT
                         :REM*162
680 IFA=10THENA=9:GOTO480
                         :REM*244
690 PRINT"{CRSR DN}ENTER LINE"A
   " "CHR$(34)           :REM*240
700 INPUT"{CRSR UP}{12 CRSR RTs
   }";A$(A)              :REM*77
710 IF(A$(1)="{LB.}")AND(A=1)TH
   ENA$(1)="":GOTO480 :REM*176
720 IFA$(A)="{LB.}"THENA=A-1:GO
   TO480                 :REM*127
730 A=A+1:GOTO680        :REM*145
740 PRINT"{SHFT CLR}{3 CRSR DNs
   }":FORX=1TOA:PRINT"LINE"X"{
   2 SPACEs}"A$(X):NEXT:PRINT
                         :REM*40
750 INPUT"{CRSR DN}WHICH LINE I
   S TO BE CHANGED";A1:PRINT
                         :REM*133
760 IF(A1<1)OR(A1>A)THEN740
                         :REM*183
770 PRINT"{2 CRSR DNs}ENTER LIN
   E "CHR$(34)A$(A1)     :REM*163
780 IFLEN(A$(A1))>=27THENPRINT"
   {CRSR UP}";           :REM*78
790 INPUT"{CRSR UP}{10 CRSR RTs
   }";A$(A1):GOTO480     :REM*5
800 PRINT"{SHFT CLR}{4 CRSR DNs
   } PUT ENVELOPE IN PRINTER."
                         :REM*251
810 PRINT"{CRSR DN} TURN ON PRI
   NTER."                :REM*141
820 PRINT"{CRSR DN} PRESS ANY K
   EY WHEN READY."       :REM*151
830 GETA$:IFA$=""THEN830:REM*42
840 OPEN1,4:GOSUB1320:CMD1,"";
                         :REM*65
850 PRINTCHR$(17);       :REM*81
860 FORX=1TOR:PRINTR$(X):NEXT
                         :REM*207
870 FORX=1TO10-R:PRINT:NEXT
                         :REM*89
880 FORX=1TOA:PRINTSPC(30)A$(X)
   :NEXT                 :REM*200
890 PRINTCHR$(145)       :REM*52
900 PRINT#1:CLOSE1       :REM*169
910 PRINT"{SHFT CLR}{CRSR DN}"S
   PC(11)"PRINT OPTIONS MENU"
                         :REM*88
920 PRINTSPC(11)"{18 COMD Ts}"
                         :REM*217
930 PRINT"{CRSR DN} "C$"F1"HR$"
    ANOTHER COPY OF THIS ADDRE
   SS."                  :REM*108
940 PRINT"{CRSR DN} "C$"F3"HR$"
    MAKE CORRECTIONS IN THIS A
   DDRESS."              :REM*126
950 PRINT"{CRSR DN} "C$"F5"HR$"
    ENTER A DIFFERENT TO{SHFT
   SPACE}ADDRESS."       :REM*212
960 PRINT"{CRSR DN} "C$"F7"HR$"
    QUIT AND EXIT TO BASIC."
                         :REM*219
970 GETF$:IFF$=""THEN970
                         :REM*222
980 IF(F$<"{FUNCT 1}")OR(F$>"{F
   UNCT 7}")THEN970      :REM*81
```

```
990 IFF$="{FUNCT 1}"THEN800
                        :REM*232
1000 IFF$="{FUNCT 3}"THEN90
                         :REM*30
1010 IFF$="{FUNCT 5}"THEN650
                         :REM*39
1020 PRINT"{SHFT CLR}"CHR$(9)CH
     R$(142):END         :REM*32
1030 PRINT"{SHFT CLR}{3 CRSR DN
     s}":FORX=1TOR:PRINT"LINE"X
     "{2 SPACEs}"R$(X):NEXT
                        :REM*173
1040 INPUT"{3 CRSR DNs}ADD A LI
     NE AFTER LINE";R1  :REM*15
1050 IF(R1<1)OR(R1>R)THEN1030
                        :REM*179
1060 R1=R1+1:FORX=9TOR1STEP-1:R
     $(X)=R$(X-1):NEXT:R=R+1:R$
     (R1)=""            :REM*145
1070 PRINT"{2 CRSR DNs}ENTER {S
     HFT L}INE{2 SPACEs}"CHR$(3
     4)                  :REM*71
1080 INPUT"{CRSR UP}{10 CRSR RT
     s}";R$(R1):GOTO90 :REM*220
1090 PRINT"{SHFT CLR}{3 CRSR DN
     s}":FORX=1TOA:PRINT"LINE"X
     "{2 SPACEs}"A$(X):NEXT
                        :REM*224
1100 INPUT"{3 CRSR DNs}ADD A LI
     NE AFTER LINE";A1 :REM*186
1110 IF(A1<1)OR(A1>A)THEN1090
                         :REM*70
1120 A1=A1+1:FORX=9TOA1STEP-1:A
     $(X)=A$(X-1):NEXT:A=A+1:A$
     (A1)=""            :REM*202
1130 PRINT"{2 CRSR DNs}ENTER LI
     NE "CHR$(34)        :REM*21
1140 INPUT"{CRSR UP}{10 CRSR RT
     s}";A$(A1):GOTO480:REM*230
1150 PRINT"{SHFT CLR}{3 CRSR DN
     s}":FORX=1TOR:PRINT"LINE"X
     "{2 SPACEs}"R$(X):NEXT
                         :REM*37
1160 INPUT"{3 CRSR DNs}REMOVE L
     INE";R1            :REM*203
1170 IF(R1<1)OR(R1>R)THEN1150
                          :REM*5
1180 IFR1=9THENR=R-1:R$(9)="":G
     OTO90              :REM*164
1190 R=R-1:FORX=R1TO8:R$(X)=R$(
     X+1):NEXT:R$(9)="":GOTO90
                         :REM*40
1200 PRINT"{SHFT CLR}{3 CRSR DN
     s}":FORX=1TOA:PRINT"LINE"X
     "{2 SPACEs}"A$(X):NEXT
                        :REM*114
1210 INPUT"{3 CRSR DNs}REMOVE L
     INE ";A1           :REM*227
1220 IF(A1<1)OR(A1>A)THEN1200
                         :REM*84
1230 IFA1=9THENA=A-1:A$(9)="":G
     OTO480             :REM*120
1240 A=A-1:FORX=A1TO8:A$(X)=A$(
     X+1):NEXT:A$(9)="":GOTO480
                        :REM*137
1250 OPEN2,8,2,"@0:EA.FROM,S,W"
                         :REM*64
1260 PRINT"{SHFT CLR}{3 CRSR DN
     s}":FORX=1TOR:PRINT"LINE"X
     "{2 SPACEs}"R$(X):NEXT
                         :REM*83
1270 PRINT"{3 CRSR DNs} SAVING
     FROM ADDRESS."     :REM*135
1280 PRINT#2,R          :REM*207
1290 IFR=1THENPRINT#2,"{LB.}":G
     OTO1310             :REM*82
1300 FORX=1TOR:RS$=CHR$(34)+R$(
     X):PRINT#2,RS$:NEXTX
                         :REM*71
1310 PRINT#2:CLOSE2:GOTO90
                        :REM*199
1320 PRINT#1:IFST<>-128THENRETU
     RN                 :REM*193
1330 PRINT"{2 CRSR DNs} TURN ON
      PRINTER{2 CRSR UPs}":CLOS
     E1:GOTO830          :REM*45
```

■



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- Warp Save/Load Available straight from Basic.

RAMLOADER

- You can also load load most of your commercial originals 25 times faster! With our special LSI logic processor and 8K of onboard Ram, Action Replay offers the world's fastest Disk Serial Turbo.

UNIQUE CODE CRACKER MONITOR

- Freeze any program and enter a full machine code monitor.
- Full Monitor Features.
- Because of Action Replay's on Board Ram the program can be looked at in its ENTIRETY. That means you see the code in its Frozen state not in a Reset state as with competitors products.

MORE UNIQUE FEATURES

- Simple Operation: Just press the button at any point and make a complete back-up of any' memory-resident program to tape or disk.
- Turbo Reload: All back-ups reload completely independent of the cartridge at Turbo speed.
- Sprite Monitor: View the Sprite set from the frozen program — save the Sprite — transfer the Sprite from one game to another. Wipe out Sprites, view the animation on screen. Create custom programs.
- Sprite Killer: Effective on most programs — make yourself invincible. Disable Sprite/Sprite/Background collisions.
- Unique Picture Save: Freeze and save any Hires Screen to tape or disk. Saved in Koala, Blazing paddles format.
- Compactor: Efficient compacting techniques — 3 programs per disk — 6 if you use both sides.
- Single File: All programs saved as a single file for maximum compatibility.
- Utility Commands: Many additional commands: Autonum, Append, Old, Delete, Linesaver, etc.
- Screen Dump: Print out any screen in 16 Gray Scales, Double size print options.
- Unstoppable Reset: Reset button to Retrieve System and Reset even so called Unstoppable Programs.
- Fully Compatible: Works with 1541/C/II, 1581, 1571 and with C64, 128, or 128D (in 64 Mode).
- Disk Utilities: Fast Format, Directory, List, Run and many other key commands are operated by Function Keys.
- Unique Restart: Remember all of these utilities are available at one time from an intergrated operating system. A running program can be Frozen to enter any Utility and the program is restarted at the touch of a key — without corruption.
- LSI Logic Processor: This is where Action Replay V gets its power. A special custom LSI chip designed to process the logic necessary for this unmatched Freeze/Restart power. No other cartridge has this power!

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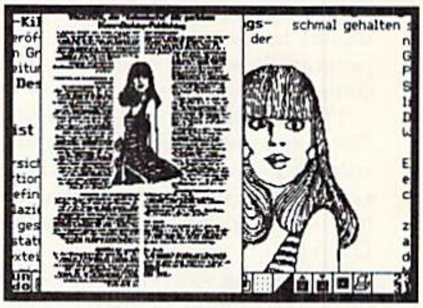

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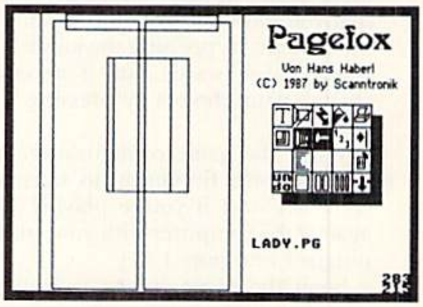

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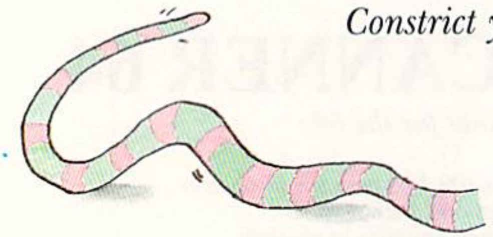
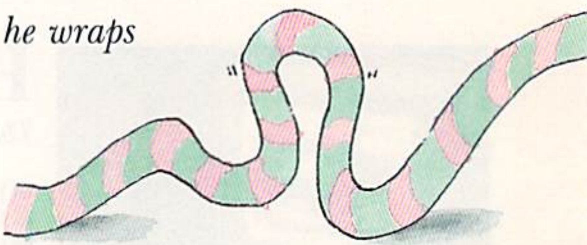
Battling Boas

Constrict your opponent before he wraps you in his coils.

◇





By STEVE HARTER

The goal of Battling Boas is to add as many segments as possible to your snaky line of blocks curling around the screen. When you hit an existing block, either yours or an opponent's, you're out for the round, and, if there are only two players (including the computer), the round is over. While avoiding collisions yourself, of course, you should try to force your opponent(s) into collisions.

The game is designed for either two people, one person and the computer or two people and the computer. When only one person is playing, the joystick should be plugged into port 2. The program is written completely in machine language.

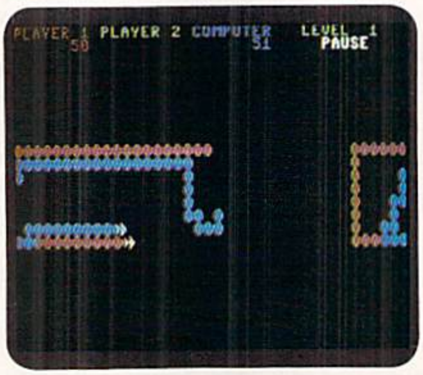
Type in Listings 1 and 2, using *RUN*'s Checksum program to detect typing errors, and save them to disk. Next, run Listing 2 to create the Writhen machine language file. To play, load and run Listing 1.

At the menu screen, you must choose the configuration of players and the other game options (described below) that you want. Simply move among the menu items by pressing the joystick forward or backward, and, if necessary, change your choices by pressing it left or right.

When the game configuration is all set, press the firebutton to start play. (It won't start if you're playing alone against the computer with your joystick plugged into port 1.)

Soon the game screen will appear, and then a block for each player at a random location within it. The red block belongs to player number 1, the green to player number 2 and the blue to the computer.

Move your block by pressing your joystick in the corresponding direction. As the block moves, another block will be left in its place, and then in each location it passes through. Thus, the "tail" of your "snake" will keep growing, until it reaches the length chosen at the menu screen. The snake cannot move backward.



One option lets you wrap around from one side of the screen to the other.

The last player to avoid a collision is the winner of the round. The game continues for the number of rounds chosen at the menu, and the game winner is the player with the highest score at that point. When the game is over, press the firebutton to return to the menu screen.

You can pause the action at any time by pressing the run-stop key; then press it again to continue. During a pause, you can quit the current game and return to the menu screen by pressing the Q key.

THE OPTIONS

Border: If set to "on," the border of the game screen is gray and impenetrable; if set to "off," the border is brown, signifying that the snakes can wrap around from one side of the screen to the other.

Speed Up: If set to "on," the snakes gradually move faster; if set to "off," their speed remains the same.

Random Blocks: If set to "on," extraneous blocks appear on the screen, obstructing your way; if set to "off," no such blocks appear.

Tail Length: Specifies to what length, in blocks, the snakes' tails will grow.

Rounds: Specifies the number of rounds in a game.

Speed: Specifies the snakes' starting speed. If you don't opt for speeding up, this will be their speed for the entire game.

Fire: These options specify what happens when you press the firebutton. "Off" results in no reaction; "inc speed" doubles your snake's speed; "hyperspace" makes your snake disappear, then reappear elsewhere, still moving in the same direction; "leave spaces" makes blank spaces appear in your snake's tail, rather than blocks; "skip" lets your snake "pass under" a single block, then "come up" on the other side. Only one of these options is in effect at a time.

SCORING

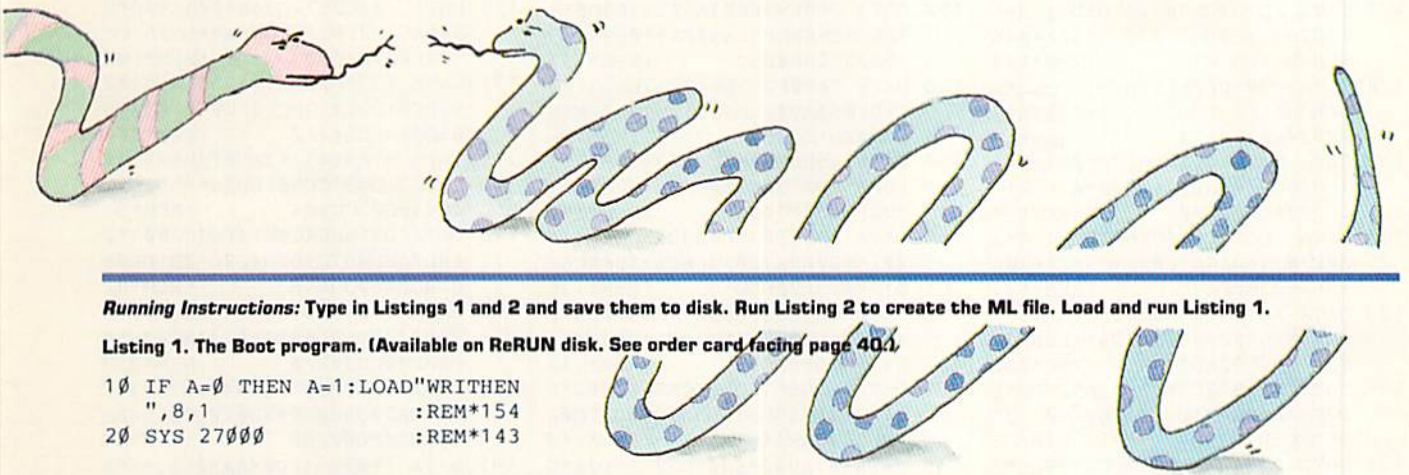
Each block you add to your snake is worth one point, and if you win a round you receive a bonus of 200 points. In addition, the numbers 20, 40 and 80 will appear randomly on the screen, and if you can "collect" one, you'll get 20, 40 or 80 points.

There are also little diamond-shaped characters that appear randomly on the screen. If you collect one of them, it, in turn, makes two other characters appear—either two more diamonds or two 20s, 40s or 80s. The diamond is not worth any points in itself.

Now, get busy and prove just how clever you are! Ⓡ

Steve Harter is currently a junior in college, majoring in business administration and computer science.

RUN it right: **C-64; one or two joysticks**



Running Instructions: **Type in Listings 1 and 2 and save them to disk. Run Listing 2 to create the ML file. Load and run Listing 1.**

Listing 1. The Boot program. (Available on ReRUN disk. See order card facing page 40.)

```
10 IF A=0 THEN A=1:LOAD"WRITHEN
   ",8,1                :REM*154
20 SYS 27000            :REM*143
```

Listing 2. Battling Boas ML creator program. (Available on ReRUN disk. See order card facing page 40.)

```
0 REM THIS LISTING CREATES (AND
   SHOULD NOT BE CALLED) WRITHE
  N                      :REM*69
5 OPEN 8,8,8,"WRITHEN,P,W"
                        :REM*183
6 CT=0:PRINT"{SHFT CLR}":REM*56
10 READ A$:IF A$="-1" THEN CLOS
   E8:PRINT:PRINT"ALL DONE!":EN
   D                    :REM*129
12 PRINT"{HOME}READING LINE "+S
   TR$(CT):CT=CT+1      :REM*141
15 IF LEN(A$)<62 THEN 55
                        :REM*254
20 B$=MID$(A$,1,20)+MID$(A$,22,
   20)+MID$(A$,43,20)   :REM*242
25 FOR I=1 TO 30        :REM*181
30 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*209
35 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55             :REM*85
40 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55            :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                         :REM*67
50 NEXT:GOTO 10         :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 70                 :REM*184
60 IF LEN(A$)<42 THEN B$=LEFT$(
   A$,20)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 70           :REM*176
65 B$=LEFT$(A$,20)+MID$(A$,22,2
   0)+RIGHT$(A$,LEN(A$)-42)
                        :REM*140
70 FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*140
80 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55             :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55             :REM*84
90 BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*148
95 NEXT:GOTO 10         :REM*160
100 REM WRITHEN ML CODE:REM*192
101 DATA 7869A900A2188D4E518D*4
    D519D00D4CA10FAA915*8D18D0A
    90820D2FFA9FF       :REM*193
102 DATA 8D0ED48D0FD4A9808D12*D
    4A9008D0EDCA9738501*A2ECBDF
    FCF9DFF27BDEB       :REM*226
103 DATA D09DEB28CAD0F1A227BD*2
    E7A9D002ACA10F7A200*8A9D003
    09D00319D0032       :REM*116
104 DATA CAD0F48602A9078503BD*7
    67A0A0A0AA88A0A0A0A*0A0A0AA
    AB900D048A502       :REM*194
105 DATA C904B007689D00304CFD*6
    9689D0031E8E8E8C8C6*0310E3A
    602E8E00790C7        :REM*66
106 DATA A9778501A9018D0EDCA9*1
    A8D18D0A200A000BD56*7A99C03
    1BD5E7A990032        :REM*95
107 DATA BD667A994032BD6E7A99*8
    032A9FF99C032C8C8C8*E8E0089
    0DBA900A8A204        :REM*47
108 DATA 99006048A991960C8C0*1
    9F00968186928 90EDE8*B0EA687
    8A96E8D1403A9       :REM*112
109 DATA 6A8D1503584C906BAD4D*5
    1F008A9008D18D44C2E*6BAE4E5
    1BD6B7C8D18D4       :REM*210
110 DATA C6C8D011AD227CF00CA6*C
    3E020900 6CA86C38E05*DCA202A
    9008D4A51B543       :REM*251
111 DATA D01BA000B566D012A001*B
    551F007A9018D4A51D0*05A5C82
    901A8989543CA        :REM*55
112 DATA 10DEEE4951AE4A51AD49*5
    1DD697C901BAD4B51D0*16A9008
    D4951A9148D08       :REM*172
113 DATA D4A9F08D0DD4A9218D0B*D
    4D005A9208D0BD4AC47*51AD485
    1D008B97F7C8D       :REM*223
114 DATA 04D4D003CE4851AD4C51*1
    879837C8D4C518D01D4*AD237CF
    00AAD1BD4C9FD       :REM*204
115 DATA 9003EE4651AD1BD4D00A*A
    D1BD4C9C09003EE4F51*209BF64
    C7EEA8502A99D        :REM*47
116 DATA 2CA9BD8D4C6BB900608D*4
    D6BB919608D4E6BA502*BD00046
    08502A99D2CA9       :REM*212
117 DATA BD8D6B6BB900608D6C6B*B
    91960186 9D48D6D6BA5*02BD000
    460A99D2CA9BD       :REM*243
118 DATA 8D8C6BB900608D8D6BA5*A
    A0A0A18791960698C8D*8E6BA53
    BBD008C602041       :REM*142
119 DATA 6FA9FF8D15D08D1DD08D*1
    7D0A9008D20D08D21D0*85AA8D1
    CD08D1BD08D10       :REM*218
120 DATA D0AA8A0AA8A9329901D0*8
    A0A0A0A0A1869809900*D0A9029
    D27D08A1869C0        :REM*68
121 DATA 9DF807E8E00790DC204C*6
    FA0FFA2008604F017E0*FA9004E
    604A200A504D0       :REM*102
122 DATA 06BD7D7A4CF66BBD777B*6
    0E8C820E16BC9289006*C838E92
    9D0F68505E820        :REM*39
123 DATA E16B8506E820E16BF05A*3
    0E1488603E605A60568*20346BA
    50620506BA603       :REM*161
124 DATA 4C0E6CA90085A2A92B8D*0
    5DCA5A2C908D0F5AD00*DCC97FD
    00CAD01DCAE47       :REM*244
125 DATA 7CE001D00209104829 10*D
    006686868 4C606F6829*0F38E90
    5AABD087C8504       :REM*220
126 DATA AD1BD4290FF0F9850560*A
    206A00EA94420346BA9*0A20506
```

►

```
    BE8EC2D7CD0F0          :REM*127
127 DATA AE2B7CA00B20FF6EAE2C*7
    CA00D20FF6EAD487C18*6910A8A
    2112002 6FAD47         :REM*160
128 DATA 7C186916A8A2062002 6F*A
    006AD217C8503201D6D*C8AD227
    C8503201D6DC8          :REM*213
129 DATA AD237C8503201D6D202B*6
    CAC2A7CA20DA920 2034*6BA404B
    9EB7B186D2A7C          :REM*149
130 DATA C905D008A9188D2F7C4C*9
    66EC909F04F8D2A7CA2*0DA8A92
    A20346BA50520          :REM*49
131 DATA 506BA404B9E67BF0C3AD*2
    A7C38E906A8B9217C49*0199217
    C8503AC2A7C20          :REM*74
132 DATA 1D6D4CC66CA603BD247C*A
    20E20346BA603BD267C*A20F203
    46BA603BD287C          :REM*171
133 DATA A2104C346B202B6CAE2B*7
    CA00BA9202 0346BA404*AD2B7C1
    8791C7CC92AD0          :REM*182
134 DATA 02A912C90ED002A9268D*2
    B7CAAA00BA91E20346B*A505205
    06BAD2B7C38E9          :REM*73
135 DATA 124A4AAABD307C8529A5*0
    4F00CC901D0B8A9088D*2A7C4CC
    66C202B6CAE2C          :REM*201
136 DATA 7CA00DA9202 0346BA404*A
    D2C7C1879177CC92AD0*02A909C
    906D002A9278D          :REM*31
137 DATA 2C7CAAA00DA91E20346B*A
    505205 06BAD2C7C38E9*094AAAB
    D367C8D467CA5          :REM*107
138 DATA 04F007C901D0B84C3B6D*2
    02B6CAE2D7CA00EA900*20506BA
    404AD2D7C1879          :REM*93
139 DATA E67BC906D002A907C928*D
    002A9278D2D7CAAA00E*A944203
    46BA505205 06B          :REM*238
140 DATA A504C902B00AAE2D7CA0*0
    EA900205 06BA504C902*D006CAA
    90A20506BA504          :REM*116
141 DATA D007A9108D2E7CD007C9*0
    1D0A34C8B6D202B6CAC*2E7CA21
    0A9202 0346BA4          :REM*12
142 DATA 04AD2E7C1879EB7BC90F*F
    086C915D007A9168D2F*7CD03B8
    D2E7CA8A210A9          :REM*217
143 DATA 2A20346BA505205 06BA6*0
    4BDE67BF0C4AD2E7C38*E91048A
    D487C186910A8          :REM*174
144 DATA A211A9202 0346B688D48*7
    CAC2E7CA2112002 6F4C*366E202
    B6CAC2F7CA205          :REM*208
145 DATA A9202 0346BA404AD2F7C*1
    879EB7BC915D008A914*8D2E7C4
    C366EC919D008          :REM*132
146 DATA A9068D2A7C4CC66C8D2F*7
    CA8A205A92A20346BA5*0520506
    BA604BDE67BF0          :REM*173
147 DATA BBAD2F7C38E91648AD47*7
    C186916A8A206A92020*346B688
    D477CAC2F7CA2          :REM*59
148 DATA 0620026F4C966EA91E2C*A
    92A20346BA9014C506B*AD1BD42
    91F8502AD1BD4          :REM*206
149 DATA 29061865026901AAAD1B*D
    4290F6903850 2AD1BD4*2905650
    2A820396BC920          :REM*27
150 DATA F004C96090D2602 0416F*2
    0416FA000A200CAD0FD*88D0FA6
    0A200A9209D00          :REM*186
151 DATA 049D00059D00069DE806*C
    AD0F1602 04C6FA200A0*00BDA37
    BF0151004850 2          :REM*234
152 DATA D00C990004A502990 0D8*9
    928D8C8E8D0E6A20FA9*009D005
    29D08529D00D0          :REM*198
153 DATA CA10F485BBAE217CBD51*7
    C8D20D0A9018D4B5120*3B6FA90
    08D4E51CE4B51          :REM*96
154 DATA A5BBCD467CD0034C4F75*E
    6BBA5BBA230C90A9006*38E90AE
    8D0F6186930 8D          :REM*162
155 DATA 2404E030F0048A8D2304*A
    002A920A22720346BCA*10FAC8C
    01990F3A208BD          :REM*135
156 DATA CD7B9DF005A90F9DF0D9*C
    A10F2A900856A8D4F51*8D4651A
    E477C8566BD59          :REM*146
157 DATA 7C8567BD5C7C8568A202*A
    D1BD4290395 0ABD537C*9D27D0A
    9FF9549A94495          :REM*168
158 DATA A3A9009540 9D50519D2A*D
    0954C954695 0D950795*438A186
    9358D5470 6903          :REM*75
159 DATA 8D6470AD1BD42903C903*F
    0F7A8B96D7C8D0035AD*1BD4290
    3C903F0F7A8B9          :REM*145
160 DATA 707C8D0038CA10A82041*6
    FA94638ED2D7C85C38D*05DCA90
    08D1BD08D17D0          :REM*143
161 DATA 8D1DD0A9018D4E51A56A*C
    901D022A9008D4E5120*3B6FA20
    2EE4E51A90095          :REM*126
162 DATA 0D954095 43CA10F5A208*A
    9209DF005CA10FAA202*A000B56
    6D003C88603CA          :REM*102
163 DATA 10F6C002B00EC000F007*A
    9C8A6032 0F2744C9C6F*A591C97
    FF012D038AD46          :REM*244
164 DATA 7C85BBCE4D51A9018D4B*5
    14CA46FA9018D4D5120*416FA20
    6BDDF7B9D4604          :REM*254
165 DATA A9019D46D8CA10F22041*6
    FA591C9BFF0CFC97FD0*F620416
    FA206BD767A9D          :REM*197
166 DATA 4604A9079D46D8CA10F2*A
    9008D4D51A200B543F0*03208A7
    1A201B543F003          :REM*149
167 DATA 208A71A202B543F00320*C
    275AD4651F012A9008D*4651200
    C6FA9442034 6B          :REM*8
168 DATA A9042050 6BAD4F51F008*A
    9008D4F51206F71E66A*A56AC90
    49002C66A4C86          :REM*249
169 DATA 70200C6FAD1BD4290348*1
    869402034 6B860268AA*BD657CA
    6024C506B8603          :REM*15
170 DATA A900954395518A186935*8
    DAA7469038DAE74BD00*DC297F8
    504A00084C6C9          :REM*236
171 DATA 7FD002B5499549850 4B5*4
    0F00BC901D004A9FF95*494C447
    2208475D0034C          :REM*103
172 DATA 4472A56AF060A5042910*D
    052AD487CF055C902D0*2DB546D
    045A9029546A0          :REM*10
173 DATA 00200D7AE001F00E20B6*7
    48AA60D9D0035989D00*386020B
    6748AA60E9D00          :REM*101
174 DATA 36989D00396 0C903D020*B
    5A3C920F01AA92095A3*B50DAA2
    0A874A603200F          :REM*110
175 DATA 744C2E72D646100 4A900*9
    546A504290F38E905A8*B9087CC
    904F007B40AD9          :REM*192
176 DATA 137CD002B50A950AA504*2
    910F01DAD487CC903D0*41B540D
    03DB5A3C944F0          :REM*106
177 DATA 37A94495A3A9019D5051*4
    C9672AD487CC901D004*9551D02
    0B440D01CC904          :REM*56
178 DATA D018B54CD014F64CA003*2
    00D7ABD497C187D4C7C*0D1BD08
    D1BD0A603B540          :REM*82
179 DATA C901F0034C4D73A56AF0*F
    9B5A348B50DAA20A874*A603B54
    CA8F00CC002F0          :REM*223
180 DATA 0868C001F0684C4D73A4*6
    1A6CA20396BC944D020*20556BA
    60329 0FD00768          :REM*67
181 DATA A901954CD04AA9019566*6
    8A001200D7AA90B9D27*D060C94
    0D009206F7120          :REM*154
182 DATA 6F714C0E73C920F01138*E
    941AABD627CA6032 0F2*74A0022
    00D7AA603B54C          :REM*123
183 DATA C902D00368D034A6CAA4*6
    1A900205 06B6820346B*A603B5A
    3C920F01FA901          :REM*105
184 DATA 20F274A529F016D507F0*0
    4F607D00EB50D38E529*AA20A87
    4A9202 0346BA6          :REM*101
185 DATA 03B54CF004C901D016A5*6
    AF012B540D00EBD567C*48B50DA
    A20A8746820 50          :REM*105
186 DATA 6BA403B60D20A874A503*8
    53C202B74A603B50A18*69C79DF
    807A5036903 85          :REM*104
187 DATA 3C202B74A603A9CB9DFB*0
    7B440F042C8C008D002*A000989
    540 60A603B40A          :REM*150
188 DATA A900853AA5CA1879E67B*1
    004A927E63AC9289004*A900E63
    A85CAA5611879          :REM*80
189 DATA EB7BC901D004A918E63A*C
    919D004A902E63A8561*6020A47
    3F640AD217CF0          :REM*253
190 DATA 12A53AF00EA9019566A9*0
    B9D27D0A001200D7AB5*4CC902F
    014B5A3C920F0          :REM*158
191 DATA 0EBD5051F007A9009D50*5
    1F002F60DADAA748D24*74ADAE7
    48D2974B50DAA          :REM*35
192 DATA A5CA9D0035A5619D0037*6
    0A603B40AB540AABD00*7CF00AA
    AA90038F9E67B          :REM*189
193 DATA CAD0F9186918850 5A63C*A
    5CA180A0A0A081865 05*8505B00
    F28B00DA9FF38          :REM*188
194 DATA FD497C2D10D04C6C7468*B
    D497C0D10D08D10D0A5*058A0AA
    8A505990 0D0A6          :REM*129
195 DATA 03B40AB540AABD007CF0*0
    AAAA90038F9EB7BCAD0*F918693 ►
    28505A5610A0A            :REM*69
196 DATA 0A1865058505A53C0AA8*A
    5059901D060BD003548*BC00356
    8AA86CA846160            :REM*12
197 DATA BD567C4848A529F019D5*0
    7F004F607D011B50D18*690138E
    529AA20A874A9            :REM*157
198 DATA 2020346BA603B50DF60D*A
    A20A8746820506B200C*6F68205
    06BA9444C346B            :REM*29
199 DATA 48BD5F7CAA68187D0752*9
    D07528A186907AAA007*BD0052C
    90A900D38E90A            :REM*236
200 DATA 9D0052CAFE0052E8D0EC*C
    A8810E8A603BD5F7CAA*A900850
    2A00786FBBD00            :REM*119
201 DATA 5285FCD004A502F00F8A*1
    86503AAA5FC1869309D*2804E60
    2A6FBE88810DE            :REM*245
202 DATA A60360A9038503A208BD*D
    67B9DF005A5039DF0D9*CA10F2A
    02820436FA503            :REM*75
203 DATA C903D00320416FE603AD*0
    0DC2910F007AD01DC29*10D0D24
    C906BB44CF02E            :REM*51
204 DATA C8C0039026A9FF38FD49*7
    CFD4C7C2D1BD08D1BD0*BD567C4
    8B50DAA20A874            :REM*240
205 DATA A94420346B6820506BA6*0
    3A00098954CB54CC902*D003A90
    060A901608603            :REM*185
206 DATA A90095438A1869358DAA*7
    469038DAE74A542D003*208475A
    56AF009A542C9            :REM*219
207 DATA 01F0034CE276A50C85FD*A
    003A900991100998B00*8810F7A
    201B566F008A9            :REM*179
208 DATA FF9D64514C9A76A9FF9D*6
    0519D6251B40D8A1869*358D1F7
    669038D2476B9              :REM*9
209 DATA 003585CAB900388561B4*0
    A20A873A40FA5CA38F9*0037F02
    8FE6051B009B9            :REM*253
210 DATA 003738E5CAFE6051C914*9
    0168D6651AD217CD011*BD60514
    9019D6051A927             :REM*58
211 DATA 38ED66518D6651A56138*F
    9003AF02AFE6251B009*B9003A3
    8E561FE6251C9            :REM*199
212 DATA 0C90188561AD217CF004*A
    561D00DBD625149019D*6251A91
    738E561186D66            :REM*218
213 DATA 519D6451CA30034CFB75*A
    D6451A000CD65519001*C8B9645
    148B962511869             :REM*36
214 DATA 010A1879625169017960*5
    18D6651AD1BD42901F0*02A9091
    86D6651A8B9EF            :REM*243
215 DATA 7B8D6751A868C90F9006*B
    9137C8D6751A60F20A8*74868F8
    4A8C6AA1004A9            :REM*108
216 DATA 0385AAA5AAAAA4FDD913*7
    CD006A901958BD0E8B5*11F02BB
    58BF00FA543D0            :REM*171
217 DATA 08A544D004A545F0D44C*B
    D78BD7B5185CABD7F51*8561BD8
    3518D4351BD87            :REM*108
218 DATA 5185AE4C5A7786AEF611*A
    9008D4351A58F85CAA5*A88561A
    5AA850C20A473            :REM*122
219 DATA A53AF00CAD217CF007A6*A
    AF68B4CEB76A6CA86BC*A46184B
    9A900A003996B            :REM*215
220 DATA 008810FAA00484BEA900*8
    D4551A5BC85CAA5B985*61A9008
    D4451AD4551F0            :REM*108
221 DATA 034CFB77C6BE30F9A5BE*A
    6AEDD137CF0F3850CA6*CAA4612
    0726BC53BF00D             :REM*59
222 DATA 20396BC944F006C920F0*2
    BD01DA6BEAD487CC904*D0BBB56
    BD003EE4551AD            :REM*253
223 DATA 4451D005EE4451D0144C*7
    577A6BEA91938F56B95*6B4C757
    7A9008D445120            :REM*201
224 DATA A473A53AF008AD217CF0*0
    34C7577A6BEF66BB56B*C90690A
    14C7577AD4351            :REM*117
225 DATA D029AD4551F004A6AA10*2
    2A20386AEA9008502B5*6BC9069
    007E4AAD00318            :REM*123
226 DATA 6901C502900486AE8502*C
    A10E8A6AE860C8AA6AA*9D8751A
    6CAA46120726B            :REM*106
227 DATA C53BF04920396BC944F0*4
    2C920F011A6AAA92338*F511100
    2A90575119511             :REM*52
228 DATA A6CAA9008D4351206F6B*2
    0A473A53AF005AD217C*D02BA6A
    AF611A543D037             :REM*74
229 DATA A544D033A545D02FB511*C
    960B0264C5A77AD487C*C904D00
    BAD4351D006EE            :REM*246
230 DATA 43514C627820556BA6AA*2
    90FD006A9029511D002*F68B4CE
    B76A5CA9D7B51            :REM*193
231 DATA A5619D7F51AD43519D83*5
    1A542F007A5FD850C4C*027AA20
    386AEA9008502             :REM*10
232 DATA B58BD021B51118692895*1
    1E4FDD00AAD1BD42907*1875119
    511EC6751D007            :REM*154
233 DATA B51118690F9511B511C5*0
    2900486AE8502CA10CE*A5AE850
    CA502C901F032            :REM*134
234 DATA A58F85CAA5A8856120A4*7
    3A6CAA46120396BC944*D01C205
    56B290FD003A9             :REM*41
235 DATA 022CA901A6AE9511958B*A
    D487CC904F0034CC878*A56AD00
    34C027AE63BA9            :REM*142
236 DATA 008553A60CB58BD00CAD*4
    87CC901D02685534CEC*79AD487
    CC903D01AA5A5             :REM*94
237 DATA C944F0034C027AA92085*A
    5A60F20A874A202200F*744C027
    AC900F06AC901            :REM*145
238 DATA F066A58F85CAA5A88561*2
    0A473A53AF005AD217C*D02DA6C
    AA46120396BC9             :REM*89
239 DATA 44D03FAD487CC902F01B*A
    54ED03CA003200D7AE6*4EAD4B7
    C186D4E7C0D1B            :REM*161
240 DATA D08D1BD04C0A7AA548D0*1
    9A000200D7AA9028548*A60320B
    6748AA60F9D00            :REM*170
241 DATA 37989D003A60C6481004*A
    9008548AD487CC903D0*0FA5A5C
    944F009A94485            :REM*178
242 DATA A5A9018D5251A54EF004*A
    5FD850C4C9672B97B7C*8D4851B
    9737C8D01D48D             :REM*91
243 DATA 4C51B9777C8D06D4B97F*7
    C09018D04D48C475160*18247EA
    5A57E241800E7            :REM*219
244 DATA 25E5E585E70000A7A5E5*E
    525270000E7A5E5E5A5*E7003C7
    EFFFFFFFF7E3C            :REM*134
245 DATA 7E3C18FFFF7E3C18183C*7
    EFFFF183C7E189CDEFF*FFDE9C1
    818397BFFFF7B            :REM*154
246 DATA 39181712091408050E87*0
    B021920131405160520*0801121
    40512FF5F0520            :REM*174
247 DATA 20203A020F12040512FF*0
    D052020203A13100505*0420151
    0FF0D05202020            :REM*137
248 DATA 3A12010E040F0D20020C*0
    F030B13FF2704140109*0C200C0
    50E071408203A             :REM*86
249 DATA 0E0F200C090D09142035*3
    0203130302031353020*3230302
    0323530FF5007            :REM*215
250 DATA 120F150E0413203A2031*2
    0203320203520203720*2039203
    1312031332031            :REM*119
251 DATA 37203139203231203235*F
    F500A1310050504FF5A*0B06091
    205203A202020            :REM*209
252 DATA 0F0606FF110C090E032E*2
    01310050504FF110F08*1910051
    21310010305FF             :REM*83
253 DATA 110B0C05011605201310*0
    1030513FF110C130B09*10FF2F0
    E100C01190512            :REM*252
254 DATA 20161320100C01190512*F
    F060E100C0119051220*1613200
    30F0D10151405             :REM*37
255 DATA 12FF060E100C01190512*2
    0161320100C01190512*2016132
    0030F0D101514            :REM*245
256 DATA 05120082100C01190512*2
    0312085100C01190512*2032208
    6030F0D101514            :REM*231
257 DATA 0512202020850C051605*0
    C202020000705142012*0501041
    907010D05200F             :REM*52
258 DATA 16051220100115130520*0
    00001FF0001FF000000*0203000
    00001010203                :REM*4
259 DATA 00020301020300070605*0
    4030201040402040404*0304000
    1040100030200            :REM*228
260 DATA 0003FD00000004FC0000*0
    0000F20060F060E0612*090A101
    600326496C8FA            :REM*241
261 DATA 010303050707090B0B0D*0
    F0F1115151901000001*0204081
    0204080090B0A            :REM*228
262 DATA 0D0E0205060001000100*0
    00008101428500A0107*0308040
    08F0C1C140911             :REM*94
263 DATA 0D090B1804DCFAFBAA0A*0
    520031080202008FDF5*00FF
                              :REM*45
264 DATA -1                   :REM*122
```

■

Button Up Your Programs

Liven up your programs with pull-down menus, pop-up calculators and calendars and other energetic features.

◇

By KEVIN SMOTHERMAN

DTLF (Does This Look Familiar)? HAT (How About This)? 1 = Or 2 = Maybe 3 = You 4 = Do 5 = This?

I've used all these methods to prompt for user input in my programs, but they're so cumbersome and cryptic. I finally got fed up with them and invested a few Saturday afternoons in creating a better way. Buttons—a flexible user interface system that is friendly enough for even a novice computerist—is the result.

Buttons has made my programs more professional looking, easier to use, and typically reduces the size of my Basic programs by 50 percent or more. And since it's written completely in assembly language, it executes with blinding speed.

If you don't want to convert to a new user-input routine, you don't have to. Buttons is a point-and-click user interface, using your proportional mouse in a dialog-box fashion. Integrate the two, using Buttons for menu selections and your own input routine for data that requires typing.

WHAT'S A BUTTON?

A "button" is a defined object that's used to get selections from the user. The appearance and function of each button on the "button screen" are defined by table structures. A button consists of three parts, each of which may or may not be switched on for any particular button. The first part (which must be present) is the "button text," a group of characters (including graphics characters) that's displayed on the "face" of the button. Think of the button as a key on your Commodore keyboard; the button text would be the character(s) on the top of the key.

The second part of a button is the border, a rectangle that surrounds the text. You can determine whether or not it will be present.

The last part of a button is the shadow, which appears as reverse video spaces to the left of and below the button. It gives a button a three-dimensional effect, similar to the shadow you see on GEOS dialog-box buttons.

BUTTON TABLE

Each part of a button may be a different color, as defined in the button table, which is a list of button definitions, preceded by a count of the buttons in that table. When Buttons displays a button screen, it doesn't erase any part of the screen; it just puts the buttons on top of whatever is already there.

Each button is described by a string that may be up to 40 characters long. Whenever the mouse sprite pointer is positioned over a button, this description string is displayed in a window. The location and color of this single-line window is user definable.

Each button also has a "flash control," which comes into effect when you put the mouse pointer over a button and press the mouse button. The button may momentarily change colors and then change back to its original color, or it may remain the new color until selected again, or until Buttons redraws that button table.

Sound complicated? It's not. Once you've tried Buttons, you'll never go back to another system!

The format of a button table is shown in Table 1. Note that any number of button tables may be pushed together back to back, and you can tell Buttons which to activate. You may define button tables anywhere in memory as long

Table 1. Button table format.

Byte	Bits	Function
1 0–7	0–255	Number of buttons in this table
2 0–4	0–31	Button Y screen coordinate (0 to 23)
6	64	Shadow display; on = suppress shadow
7	128	Border display; on = suppress border
3 0–5	0–63	Button X screen coordinate (0 to 39)
7	128	Flash control: on = change, off = flash
4 0–5	0–63	Button width
5 0–3	0–15	Border color
4–7	0–15	Button text color (0 to 15 × 16)
6 0–3	0–15	Shadow color
4–7	0–15	Flash color (0 to 15 × 16)
7 0–7	0–255	Button text pointer, low byte
8 0–7	0–255	Button text pointer, high byte
9 0–7	0–255	Button description pointer, low byte
10 0–7	0–255	Button description pointer, high byte
. . .	. . .	More buttons
. . .	. . .	More tables

RUN it right: **C-64; 1541 drive**

as everything is consecutive. The easiest way to define button tables is with an assembler, but you can also poke them into memory or build them as data files and load them where you want.

The "button width" includes the border (two characters) and the shadow (one character). When defining the button width, allow for the border/shadow only if the button is being defined with the border/shadow option.

The "button text pointer" is a two-byte low/high pointer to a text string of length *exactly* equal to the button width minus 2 (if a border is used) and/or minus 1 (if a shadow is used).

The "button description pointer" is a two-byte low/high pointer to a text string that is zero-delimited (a zero byte ends the string). If this text string is wider than the window for button descriptions, it will be truncated at the window length.

So, now you know how to define buttons, how to group them in a button table and how to group tables consecutively for Buttons to display. To display these buttons, refer to the memory map in Table 2 that outlines important memory locations to use.

USING BUTTONS

To use Buttons, start by individually typing in Listings 1, 2, 3 and 4, using *RUN*'s Checksum program to check for errors, and then save them to your work disk. Next, load and run Listing 2 to create a file called BUTTONS.O on the work disk. Then, load and run Listing 3 to create a file called MOUSE. POINTER on the same disk. Finally, load and run Listing 4 to create a file called SAMPLE.O.

Once you have BUTTONS.O, MOUSE. POINTER and SAMPLE.O on disk, load and run Listing 1 to see the sample program in action. The only time you'll need to run Listings 2 and 3 again will be if you want to install Buttons on another work disk.

MOUSE.POINTER is simply a sprite definition program. You can define any sprite you want—hi-res or multicolor—provided it is sprite 0, and you should set address 2040 to indicate what 64-byte group you want to use to store the sprite. I recommend block 11 (starts at address 704). A complete discussion of sprites is beyond the scope of this article, but the sample program contains an example of how to set up a sprite for Buttons to use.

Table 2. Memory locations to display buttons.

Location	Function
679	Button selected (1 to number of buttons)
680	Button table number to display/activate (1 to number of tables)
681,682	Vector to routine that displays a button table
683,684	Vector to routine that activates a button table
690	Description window Y screen coordinate (0 to 23)
691	Description window X screen coordinate (0 to 39)
692	Description window width (0 to 40; 0=no window)
693	Description window color (0 to 15; add 128 to use reverse video)
828,829	Pointer to start of last displayed button table
833,834	Pointer to start of first button table
49152	Address of routine that initializes the Buttons environment

Next poke or load in your button table definitions. After this, poke in the values to position the description window. SYS 49152 will now set up the Buttons program to use these parameters and will initialize memory locations 833,834 to point to the first free byte past the actual Buttons driver code. You may change it to point wherever you want, though.

To display a button table, type in POKE 680 with the button table number to display, then type SYS PEEK (681)+PEEK(682)*256 to display the button screen. To activate the buttons and allow the user to select one, type POKE 680 with the button table number to activate (if you need to), and SYS PEEK(683)+PEEK(684)*256 to activate it.

After the user selects a button, the SYS call will return and memory address 679 will reflect which button was selected (1 to number of buttons). To reactivate the same table, just repeat the SYS PEEK(683)+PEEK(684)*256.

If you have a button defined with the Shadow option turned on, the shadow is what will be flashed by the Buttons driver. If the Border option is on and the Shadow option is off, then the border will be flashed. If both shadow and border are off, then the button text itself is flashed.

With these simple building blocks, you'd be surprised at the complexity of menu-type structures you can create. And, best of all, each one is just a point and click away! Ⓡ

Kevin Smotherman is a systems programmer. At home, he programs utilities on his C-64 and co-edits the Nebraska state chess newsletter, The Gambit, *using geoPublish.*

Listing 1. Buttons program. (Available on ReRUN disk. See order card facing page 40.)

```
10 REM SAMPLE PROGRAM FOR BUTTO
   NS                    :REM*147
20 IFX=0THENDV=PEEK(186):X=X+1:
   LOAD"BUTTONS.O",DV,1 :REM*76
30 IFX=1THENX=X+1:LOAD"SAMPLE.O
   ",DV,1                :REM*26
40 IFX=2THENX=X+1:LOAD"MOUSE.PO
   INTER",DV,1           :REM*32
50 POKE 53280,11:POKE53281,11:P
   RINT"{SHFT CLR}"     :REM*222
60 REM SET SPRITE POSITION: V=X
   -COORD, V+1=Y-COORD :REM*144
70 V=13*4096:POKEV,100:POKEV+1,
   100                   :REM*161
80 REM SPRITE 1 COLOR TO WHITE.
   {2 SPACEs}SET SPRITE 1 X-COO
   RD < 256              :REM*119
90 POKEV+39,1:POKEV+16,0
                         :REM*205
100 REM SET SPRITE 1 BLOCK POIN
    TER TO 11*64=704     :REM*64
110 POKE 2040,11         :REM*167
120 REM INITIALIZE BUTTON DRIVE
    R                    :REM*127
130 SYS 49152            :REM*41
140 POKE 680,1           :REM*253
150 REM BUTTON DESCRIPTION
                         :REM*92
160 POKE 690,3:POKE691,5:POKE 6
    92,30:POKE693,128+1 :REM*31
170 REM DISPLAY TABLE 1:REM*255
180 SYS (PEEK(682)*256+PEEK(681
    ))                   :REM*134
190 REM ACTIVATE BUTTON TABLE
                         :REM*131
200 SYS (PEEK(684)*256+PEEK(683 ►
   ))                  :REM*61
210 REM CHECK FOR QUIT :REM*181
220 IF PEEK(679)=12 THEN PRINT"
    {SHFT CLR}":END       :REM*12
230 REM RE-ACTIVATE TABLE FOR N
    EXT SELECTION          :REM*4
240 GOTO 200                :REM*46
```

Listing 2. Create BUTTONS.O program. (Available on ReRUN disk. See order card facing page 40.)

```
0 REM THIS LIST 1 CREATES (AND
  SHOULD NOT BE CALLED) BUTTONS
  .O                   :REM*180
5 OPEN 8,8,8,"BUTTONS.O,P,W"
                       :REM*221
6 CT=0:PRINT"{SHFT CLR}":REM*56
10 READ A$:IF A$="-1" THEN CLOS
   E8:PRINT:PRINT"ALL DONE!":EN
   D                   :REM*129
12 PRINT"{HOME}READING LINE "+S
   TR$(CT):CT=CT+1     :REM*141
15 IF LEN(A$)<62 THEN 55
                       :REM*254
20 B$=MID$(A$,1,20)+MID$(A$,22,
   20)+MID$(A$,43,20)  :REM*242
25 FOR I=1 TO 30       :REM*181
30 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                       :REM*209
35 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55            :REM*85
40 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55           :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*67
50 NEXT:GOTO 10        :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 70                :REM*184
60 IF LEN(A$)<42 THEN B$=LEFT$(
   A$,20)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 70          :REM*176
65 B$=LEFT$(A$,20)+MID$(A$,22,2
   0)+RIGHT$(A$,LEN(A$)-42)
                       :REM*140
70 FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                       :REM*140
80 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55            :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55            :REM*84
90 BY=H*16+L:PRINT#8,CHR$(BY);
                       :REM*148
95 NEXT:GOTO 10        :REM*160
100 REM HEX DATA FOR BUTTONS DR
    IVER               :REM*208
101 DATA 00C0A9A88D4103A9C48D*4
    203A9238DA902A9C28D*AA02A95
    38DAB02A9C08D      :REM*110
102 DATA AC02A9888D4503A9C48D*4
    603608CF5038DF403A2*0038EDF
    503297FC940B0      :REM*159
103 DATA 074AF012ACF4036009C0*C
    9FFF008386AA2FFACF4*0360A90
    060A9010D15D0      :REM*203
104 DATA 8D15D078A001A2FFCAD0*F
    D88D0F8D8AD19D4ACF2*032029C
    08CF203186D00      :REM*158
105 DATA D08D00D08A69002901 4D*1
    0D08D10D0AD1AD4ACF3*032029C
    08CF303384 9FF      :REM*30
106 DATA 6D01D08D01D058AD3C03*8
    5FDA90085C6A9018DA7*02AD3D0
    385FEF0ABA000       :REM*74
107 DATA B1FD8D4003E6FDD002E6*F
    EAD01D038E9324A4A4A*8D3E03A
    D10D04AAD00D0       :REM*88
108 DATA 6A4A4A38E9038D3F0320*3
    6C4A5192940F00AA9F0*8DF3C0A
    9028DF4C0A51A      :REM*169
109 DATA 293FCD3F03EAEAB03465*1
    BCD3F03F02D902BA519*291FCD3
    E03F002B02069      :REM*181
110 DATA 03AAA980251 9F002CACA*8
    ACD3E03F00F900D20BE*C3AD01D
    C2910F0204C5B      :REM*245
111 DATA C0EEA702A5FD18690985*F
    D9002E6FEACA70288CC*4003909
    720FBC34C5BC0      :REM*149
112 DATA AD01DC2910F0F9A90085*C
    6A51A2980F04AADA702*AACA8A2
    9078D48038A29      :REM*155
113 DATA F84A4A4AA8AD450385FB*A
    D460385FCA901AE4803*F0040AC
    AD0FC8D4803B1      :REM*191
114 DATA FBAA2D4803D00C8A4D48*0
    391FB20B6C14C1AC28A*4D48039
    1FB20ECC14C1A      :REM*192
115 DATA C220B6C1A008A2FFCAD0*F
    D88D0F820ECC14C1AC2*A519294
    0D008A9F08D56       :REM*32
116 DATA C34C4CC3A5192980D016*A
    91D8DB2C2A9F08DB4C2*20ABC2C
    EB2C2A90F8DB4      :REM*208
117 DATA C260A91D8D1AC3200BC3*C
    E1AC360A5192940D008*A90F8D5
    6C34C4CC3A519       :REM*45
118 DATA 2980D00DA91C8DB2C2A9*0
    F8DB4C24CABC2A91C8D*1AC3A9F
    08D1CC34C0BC3      :REM*127
119 DATA A9FE2D15D08D15D060AD*4
    10385FD2020C4AD4203*85FEA00
    08CB102AEA802      :REM*177
120 DATA CAF025B1FD85020A0A0A*9
    002E6FE18650290 02E6*FE18690
    19002E6FE1865       :REM*23
121 DATA FD9002E6FE85FD4C38C2*B
    1FD8D4803A5FD8D3C03*A5FE8D3
    D03E6FDD002E6       :REM*95
122 DATA FE2036C4A90F8D56C3A5*1
    92940D00320 4CC3A519*2980D00
    320ABC2200BC3       :REM*53
123 DATA A5FD186909900 2E6FE85*F
    DCE4803D0D3A97F8DB6*022003C
    4602053C4205E       :REM*66
124 DATA C4A51C290F2069C4A96F*2
    075C4A9B720CAF1CE4A*03D0F6A
    97020CAF12053      :REM*138
125 DATA C4A9402519D001C8E818*2
    00AE5A9A52075C4A91D*20CAF1C
    E4A03D0F6A9A7      :REM*196
126 DATA 20CAF12053C4E8E8205E*C
    4A96C2075C4A9AF20CA*F1CE4A0
    3D0F6A9BA4CCA       :REM*36
127 DATA F12053C4A9802519D002*E
    8C8205EC4A51C29F020*69C4A51
    E85FBA51F85FC      :REM*176
128 DATA A51BAAA0008C4B03A980*2
    519D002CACA207DC4B1*FB20CAF
    1EE4B03AC4B03      :REM*150
129 DATA CE4A03D0F0602053C418*2
    00AE5A51D290F2069C4*A91285C
    7A9A920CAF1A2       :REM*14
130 DATA 038E4903A9802519F005*A
    2018E4903A99D20CAF1*A91120C
    AF1A9202 0CAF1      :REM*174
131 DATA CE4903D0ECA51BAACACA*8
    E4A034C9AC3A9202 0CA*F1CE4A0
    3D0F6A90085C7       :REM*55
132 DATA A9A94CCAF1AEB202ACB3*0
    218200AE5ADB502AA29*8085C78
    A297F8D860260      :REM*248
133 DATA A900CDB602D00FADB102*C
    DA702F0062003C44CD4*C36020A
    5C3ADA7028DB1      :REM*237
134 DATA 02A000840 2B120F00C20*C
    AF1E602A402CCB402D0*F0A9008
    DB602A90085C7       :REM*78
135 DATA 60A97FCDB602D0016020*A
    5C3A0008CB1028402A9*2020CAF
    1E602A402CCB4      :REM*231
136 DATA 02D0F2A97F4CF3C3A01F*A
    D45038522AD46038523*A900912
    288D0FB912260       :REM*61
137 DATA A209A000A91985FBA900*8
    5FCB1FD91FBC8CAD0F8*A9EA8DF
    3C08DF4C060A5      :REM*164
138 DATA 19291FAAA51A293FA860*A
    9402519D001C8184C0A*E5C9109
    0044A4A4A4A8D       :REM*43
139 DATA 860260 20CAF1A51BAACA*C
    AA9402519D001CA8E4A*0360000
    0000000000000      :REM*101
140 DATA 00000000000000000000*0
    0000000000000000000*0000000
    0                   :REM*14
141 DATA -1            :REM*252
```

Listing 3. Create MOUSE.POINTER program. (Available on ReRUN disk. See order card facing page 40.)

```
10 REM POINTER.MAKER    :REM*57
20 D=PEEK(186):OPEN2,D,2,"0:MOU
   SE.POINTER,P,W"     :REM*182
30 PRINT#2,CHR$(704-INT(704/256
   )*256);             :REM*205
40 PRINT#2,CHR$(INT(704/256));
```

```
                          :REM*136
50 FORX=704TO767:READQ:PRINT#2,
   CHR$(Q);:NEXTX         :REM*234
60 CLOSE2:END             :REM*237
70 DATA 255,240,0,213,112,0,213
   ,192,0,213,192,0,213,112,0,2
   21,92,0,243,87         :REM*154
80 DATA 0,0,213,192,0,53,112,0,
   13,240,0,3,192,0,0,0,0,0,0,0
   ,0,0,0,0,0,0,0         :REM*117
90 DATA 0,0,0,0,0,0,0,0,0,0,0,0
   ,0,0,0,0,0             :REM*214
```

Listing 4. Create SAMPLE.O program. (Available on ReRUN disk. See order card facing page 40.)

```
0 REM THIS LIST 1 CREATES (AND
  SHOULD NOT BE CALLED) SAMPLE.
  O                       :REM*33
5 OPEN 8,8,8,"SAMPLE.O,P,W"
                          :REM*46
6 CT=0:PRINT"{SHFT CLR}":REM*56
10 READ A$:IF A$="-1" THEN CLOS
   E8:PRINT:PRINT"ALL DONE!":EN
   D                      :REM*129
12 PRINT"{HOME}READING LINE "+S
   TR$(CT):CT=CT+1        :REM*141
15 IF LEN(A$)<62 THEN 55
                          :REM*254
20 B$=MID$(A$,1,20)+MID$(A$,22,
   20)+MID$(A$,43,20)     :REM*242
25 FOR I=1 TO 30          :REM*181
30 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                          :REM*209
35 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55              :REM*85
40 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55              :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                          :REM*67
50 NEXT:GOTO 10           :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 70                   :REM*184
60 IF LEN(A$)<42 THEN B$=LEFT$(
   A$,20)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 70             :REM*176
65 B$=LEFT$(A$,20)+MID$(A$,22,2
   0)+RIGHT$(A$,LEN(A$)-42)
                          :REM*140
70 FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                          :REM*140
80 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55              :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55              :REM*84
90 BY=H*16+L:PRINT#8,CHR$(BY);
                          :REM*148
95 NEXT:GOTO 10           :REM*160
100 REM HEX DATA FOR SAMPLE
                          :REM*115
101 DATA A8C40FC0000470303 0C5*3
    4C5C005047030 52C556*C5C00A0
    5703070C575C5         :REM*238
102 DATA C884074030 8CC593C5C9*8
    40740 30A6C5ADC5CA84*084030C
    1C5C9C5471A06         :REM*190
103 DATA 0010E4C5E8C54A130700*1
    0F8C5FDC54A1A06001 0*12C616C
    64A200700 1028        :REM*66
104 DATA C62DC64D1A0600 1043C6*4
    7C614800 7ECA059C65D*C614880
    4ECA06DC66EC6         :REM*197
105 DATA 148D04ECA079C67AC614*9
    204ECA085C686C65341*5645534
    1564520544845         :REM*5
106 DATA 20435552 52454E542046*4
    94C4520544F20444953*4B004C4
    F41444C4F4144         :REM*72
107 DATA 20412 04E45572046494C*4
    52046524F4D20444953*4B00505
    2494E54505249         :REM*91
108 DATA 4E5420544845204355 52*5
    2454E542046494C4500*444F205
    4484953444F20         :REM*167
109 DATA 5448495320 5448494E47*2
    048455245 00444F2054*4841544
    44F2054484154         :REM*145
110 DATA 204F544845522 0544849*4
    E4700444F204F544845*52594F5
    5204B4E4F572C         :REM*150
111 DATA 2054484520 4F54484552*2
    05448494E4721002055*5020504
    14E2055502054         :REM*242
112 DATA 484520 46494C45004C45*4
    6542050414E204C4546*5420494
    E2054484520 46        :REM*151
113 DATA 494C4500484F4D45474F*2
    0544F20544F50204F46*2046494
    C450052494748         :REM*142
114 DATA 5450414E205249474854*2
    0494E2054484520 4649*4C45004
    44F574E50414E         :REM*255
115 DATA 20444F574E2054484520*4
    6494C450051554954 52*4554555
    24E20544F2042         :REM*174
116 DATA 4153494300 31444F2054*4
    8494E472031003 2444F*2054484
    94E47203200 33        :REM*103
117 DATA 444F205448494E472033*0
    0                     :REM*97
118 DATA -1               :REM*231
```

■

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PROTIPS

Make your computing life easier by taking advantage of these software and hardware hints.

By HAROLD R. BJORNSEN

GEOS: Do you have a disk with a lot of files on it and don't like flipping page after page of icons looking for a particular file? Use the deskTop's View Box and select View by Name. You can quickly locate the file by name, click it on, return to View by Icon, and you'll be on the proper page with the file highlighted!

—BUDDY GROHS
BAY MINETTE, AL

GEOS (VERSION 2.0): Using the Copy option (Commodore/K) from the deskTop, I load all my application files into my RAM expansion unit. It takes about one minute and 40 seconds to transfer these files. I then take another source disk and load in the necessary work files. Next, I activate the application from the REU and create new files or work on older files as necessary. At the end of the session, I transfer the new files or the adjusted older files back to the 1541 drive for permanent storage. This is easily done by highlighting the file or files and dragging the highlighted icon to the A Drive icon on the right border. A few seconds later, the file transfer is complete. I then go to the A Drive to check the file transfer. If everything is satisfactory, I shut down the system or load a new application.

—D. DAYTON LIVINGSTON
HOLBROOK, AZ

GEOWRITE: When you insert a graphic in a geoWrite document, it always comes out centered between the margins. If you want the graphic on the left side, move the right margin to the left; if you want it on the right, move the left margin to the right.

—BUDDY GROHS
BAY MINETTE, AL

PAPERCLIP III: have a certain way of setting up files that you use time and again, then saving them in a little file of their own will save you a lot of typing. For example, my letters always use the same format, so I've got a file on my Letters disk called "/", which I can load with four keystrokes: control/L,/,return. The actual file looks like this:

```
✓cm:l.filenamyymmdd.: (c)orrespondence
(l)etter←
✓S=_________________←
✓pr1:pt12:ls6:lm10:rm82:pp65:pg54:
 tm0:ju0←
✓pf10:ft3::<1>←
```

It also has my default tabs in it. Then all I have to do to write the letter is put in the filename/date in the first line, press shift/run-stop to get to the end of the text, and start typing.

—D. DAYTON LIVINGSTON
HOLBROOK, AZ

STAR NX-1000C: Using the following DIP switch settings on this printer works best: 1,5,6,7,8,9 switched on; 2,3,4 switched off. Despite what the printer manual says, GEOS 2.0 cannot be overridden to produce the built-in fonts or italic/underlining/boldface features in NLQ mode (using the Commodore 10 point font).

—JOEL M. SANDA
BOISE, ID

SUPERBASE 64/128: If you've ever updated one of your Superbase programs and then saved the modifications, only to later discover that you incorrectly entered the filename, you'll appreciate this tip. I always make the first line of every program a comment line of the following syntax:

```
REM SAVE"<your-prgm-name>" REM
<modification-date>
```

Having the above program header line appear in every one of your programs will insure that you are always aware of the name of the program contained in Superbase's Program Editor. It also makes your hard copy listings easier to file. Furthermore, by taking advantage of Superbase's command line buffer, no longer will you have to manually enter the Save command and risk not entering the correct filename.

After making program modifications and prior to exiting the Program Editor, make sure that the cursor is located on the above program header line. Once Superbase's main menu appears, use the left-arrow key to cause the last command to appear on the command line—with your cursor on the above program header line when you exit the editor, the program header line will be displayed on the command line. Use the space bar to blank out the REM portion of the command, press return and the command is executed, saving the current contents of the program editor under the filename contained within quotation marks (Superbase will append p to the filename if it doesn't already end that way). The REM following the save filename is to make the remainder of the command (modification date) appear as a comment to Superbase's Command Interpreter.

—ROY E. KANNADY, JR.
LITTLETON, CO

THE WRITE STUFF (VERSION 2): If you have a 1581 disk drive and put the dictionary in your REU, you can automate the process and eliminate all the disk insertion prompts. Load the file RAMFC from Basic and list it. Remove PRINT in line 90 and delete lines 95 and 155. Replace line 150 with GOTO 120. If your dictionary is in a subdirectory, replace line 95 with the Open command to select the subdirectory, and replace line 155 with another OPEN to return to the root. Now, simply run RAM FC, and the dictionary and word processor will load automatically.

—HENNING VAHLENKAMP
MATAWAN, NJ ■

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128 MODE

Scale the heights of Basic 7.0 with this neglected graphics command.

By MARK JORDAN

THE SCALE COMMAND on the C-128 is an obscure and underused fellow. In the years since the 128 has been out, I have yet to see an article detailing its use, and, considering how cryptically the *C-128 System Guide* deals with Scale, this is a shame. The shame is even greater when you consider how powerful this command is.

Scale is a graphics command that lets you treat the screen as if it were much bigger than the 320×200 grid it actually is. In effect, this gives you the power to alter, either horizontally or vertically, the size of any Basic drawing. You can:

- Create perfectly shaped circles and squares on screen.
- Change the proportions of drawings.
- Stretch or shrink drawings to fit onto the screen.
- Move sprites on a big grid.

It's important to remember that scaling is virtual, not actual. Your actual Commodore graphics screen has 320×200 resolution whether or not you use scaling, but with scaling you can treat the screen as if it were a much larger grid—up to 32767×32767.

Using Scale is as simple as typing SCALE 1,X,Y, where X is any number from 320 to 32767, and Y is any number from 200 to 32767. The *System Guide* somewhat confuses matters by stating that Scale defaults to 1023 for both X and Y. What it means is, if you type SCALE 1 and leave off the X and Y parameters, X and Y will be set to 1023. However, with Scale turned off (or if it was never turned on), your screen's true default is 320×200.

Using Scale is easy; however, using it effectively takes some thought. Let's see how you can put Scale to work.

PERFECT CIRCLES AND SQUARES

The command BOX 1,0,0,10,10 should result in a perfect square, but it doesn't. On the screen, it looks more like a rectangle. Likewise, CIRCLE 1,20,20, 10,10 should draw a perfect circle, but you'll see an ellipse instead. The problem is that computer monitors have distorted "aspect ratios"; the tiny dots that make up the image on the screen are a little longer than they are wide.

Scale gets around this problem by raising the Y value to shrink the screen vertically and change the aspect ratio. Why raise it instead of lower it? Because the larger the number you use with Scale, the larger your computer thinks your screen is, and the smaller it draws things to fit. On my monitor, a Commodore 1902, Y needs to be about 250 (for an aspect ratio of 320:250, or 1.28), and the appropriate command is SCALE 1,320,250. With your monitor, you may have to adjust the 250 up or down a little.

Once you know the correct ratio for your monitor, you can apply it to all scaled screens, in one of two ways: Either divide the ratio into the X value you scale your screen with or multiply it times the Y value you use. The result will be the value for the other coordinate. Using 1.28 for the ratio, if X is scaled to 1000, Y should be 781 (1000 ÷ 1.28 = 781).

Actually, you'll want to scale your screen this way, not just for circles and squares, but in all cases where you need to match the finished shape with the parameters you use.

STRETCHED PICTURES

Now that you know how scaling works, it's easy to see how to apply it for some creative effects. For example, to change the proportions of drawings, simply enlarge either the X or Y variable more than the other. If you make the X value higher, the drawing will get skinnier; if you raise the Y value, it will fatten up.

SCALE 1,10000,200 renders some mighty tall and skinny drawings, because you told the C-128 that its width is now 10000 grid points, while its height is a normal 200. In contrast, a line drawn from 0 to 100 (as in DRAW 1,0,0 TO 100,0) only stretches 100:10000 (or 0.01) of the screen's width—a mere three pixels.

FULL-SCREEN DRAWINGS

Scale also lets your drawings fill the screen, no matter what size they really are. For a drawing based on a large grid, set the scaling to the largest dimension of the drawing (or a little larger in some cases). Example: To draw the state of Indiana on my screen, using miles as the base unit of measurement, first I need to find the state's longest dimension—275 miles. Then 275 (or a little more for a border) becomes the Y value. With it, the X value can be calculated: 275×1.28 = 352. So, SCALE 1,352,275 would place Indiana fully on my screen with minimal wasted space.

What if I want to stretch a drawing with small dimensions to fill up the screen? Again, I need the largest dimension to begin the Scale calculations. Example: To fill a screen with a horizontal drawing of a 4×8 sheet of plywood, using inches as the base unit of measurement, I would divide 96 (8 feet is 96 inches) by 1.28 for a result of 75. So the command would be SCALE 1,96,75, right?

Wrong—because you can't scale lower than 320×200. To get around this limitation, simply add a zero to the X and Y values (multiply them by ten): SCALE 1,960,750. Add a zero to all inch dimensions, and you'll see a plywood rendition that fills the screen.

MOVING SPRITES ON A LARGE GRID

Scaling works with MOVSPR and other sprite commands. Normally, when you place a sprite on the screen, you must set it within the 0 to 320 range. However, with scaling, you can place it anywhere from 0 to as high as the screen scaling. Just decide how big to scale your screen and then place your sprites with MOVSPR.

This can be quite handy. Suppose you've drawn a map of the U.S.A. by scaling your screen 4000 by 3000 (to correspond to miles). To see approximately where 1730 miles east from Los Angeles is (as a crow flies), first place your sprite on L.A., then use MOVSPR 1,+1730,+0, and the sprite will show you instantly.

You'll find scaling indispensable once you begin to design games with it. But even if you're not a programmer, sit down for an hour or so and play with Scale. It's fun, it's powerful, and it demonstrates on a very large scale just how sweet a language Basic 7.0 is. ■

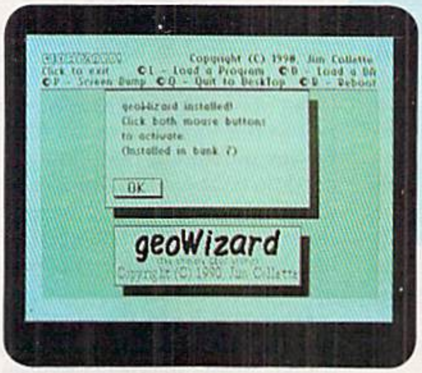
Mark Jordan is a high school English teacher and long-time Commodore programmer.

GEOWATCH

Gee-Wiz! GeoWizard turns accessing GEOS applications into magic.

By GERRY DESCOTEAUX

HOW DO YOU SPELL RELIEF? Well, if you're a GEOS user you spell it geoWizard. That's the name of a new program, from Comm-Plex Software's 16-year-old geoGenius Jim Collette, that lets you bring up any GEOS application from inside any other, without going through the deskTop.



geoWizard installed!
Click both mouse buttons
to activate.
(Installed in bank 7)

You can transform GEOS into an easier-to-use program through the magic of geoWizard.

Imagine being inside a geoPublish document and needing to create a graphics bitmap image. Up to now, you had to close the document, return to the deskTop, then open either the paint program or a paint file already on disk—all very time consuming. With geoWizard you can go right from your document to the program or disk file, do what you have to do, and then return to the document where you were. GeoWizard runs as an autoexecute file, so it works as if it were part of the GEOS system.

GeoWizard's one system requirement is plenty of RAM disk space—at least 512K. However, you can increase this capability by having your 1764, 1750 or other REU upgraded to 1 or 2 megabytes. With a 1-meg upgrade and Jim Collette's new Configure 2.1 file (available through Q-Link) on your GEOS boot disk, an REU can emulate a 1581 drive. With a 2-meg REU upgrade, you can even add two 1581 RAM disks to your system. Completing the picture, geoWizard's mini-deskTop supports three live drives, each completely accessible, instead of two live ones and a ghost.

I opted for the 1-meg upgrade configured as a 1581 RAM disk. Together with the Configure 2.1 file on my boot disk, I now have 790K to use in publishing a free local music magazine, *The Back Page*.

REU upgrades are available from a number of sources (see Table 1). Montgomery Computer Service of Plano, Texas (where I had mine done), will take your current REU and upgrade it to whichever configuration you wish, or you can send your REU to them, and the same day they receive it, they'll send out one already upgraded.

Table 1. Contacts.

For REU upgrades:
Montgomery Computer Service
Melvin Montgomery
1504 Amherst
Plano, TX 75075
or
R.R. Electronics
PO Box 57607
Murray, UT 84157

For geoWizard:
Comm-Plex Software
Jim Collette
6782 Junction Rd.
Pavilion, NY 14525-9755

Still another option is to send just payment, including a $100 deposit to guarantee that once you receive the upgrade you'll send them your old REU. This is convenient for those who can't do without their REU for even a day. It took one week total for me to get mine to them and receive my new 1024K REU. I couldn't be happier with it, and I gather from reading the post on the Q-Link GEOS boards that no one has had any problems with a Montgomery upgrade. However, just in case, their REUs come with a warranty.

Incidentally, you can reach Melvin Montgomery (of MCS) on Q-Link, where his handle is, appropriately, CMDR Fixer. Jim Collette is also available on Q-Link, as geoRep Jim. Both of these gentlemen are usually available several nights a week in the GEOS Chat area in the Software Showcase area on Q-Link. If you don't find them there, you can send them a note via E-Mail. They're adept at answering any GEOS-related questions. ■

Gerry Descoteaux uses GEOS on his C-64 to publish a monthly music magazine in southern New Hampshire.

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4RUN2

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GOLD MINE

Here are this month's gaming nuggets from fellow readers across the country.

By LOUIS F. SANDER

BUBBLE BOBBLE: On Level 1, try to pop all the bubbles on the top at the same time. This will give you a lot of points and a lot of french fries.

On Levels 4 and 5, go all the way down to the bottom hole, blow a lot of bubbles to get the guys, then pop them all at the same time. This will give you a lot of fruit.

Getting the umbrella on Level 7 will take you to Level 13. When you're there, bounce on bubbles to get a Blue Water Cross.

—BRIAN SHAPELLA
COLLINGSWOOD, NJ

CHAMPIONS OF KRYNN: At the beginning of the game, try to buy Plate Mail for your Fighter(s). Buy Scale or Chain Mail for your Cleef. Before encountering an Aurak Draconian, make sure your Clerics have memorized at least two Dispel Magic spells; you'll need them when the Aurak casts a Fire Shield.

In the Nereka prison, you may hold the Prison Lord. In Kemen Square, you may rest a while with the Ogres, providing you have allied with them beforehand. In Myrtani's stronghold, after you have defeated the Dragon Master, you may go back to the treasure room to rest.

When fighting Myrtani, concentrate your attacks on Myrtani and the Bozaks, since they're the only real threat. In the Last Battle, cast Resist Fire, then charge the dragons. Keep your weaker characters back and advance your fighters, especially the one with the Dragonlance. Have your Magic-User zap the dragons with Lightning Bolt spells.

—JEREMY YOUNG
ADDRESS UNKNOWN

CURSE OF THE AZURE BONDS: If you have a fairly powerful party, here is an easy way to make money: Go to Zhentil Keep and walk around until some fighters, mages or other beings attack you. Once you finish them off, take all their items, most of which are magical. Sell them at one of the stores for a nice profit.

In Yulash, find the dead Cleric (he's along the way to the pit) and kill the Shambling Mounds around him. After the battle, you'll get a Wand of Defoliation that will be very useful when fighting other Shambling Mounds.

—AMAR PAI
LAS VEGAS, NV

F-14 TOMCAT: If you're still having trouble with the early flight training tests, stop trying so hard! Instead of trying to follow the instructor, just follow the arrows in the lower left-hand corner of the screen. As you may have already noticed, they light up, depending on which way you should go next. If you follow them exactly, adding control movements of your own to level the plane out after a roll, and so on, you should do very well on your training. I got 96 percent the first time I used this technique, when I had never gotten more than 30 percent before!

In the advanced training flight against Bones, you must get the advantage over him immediately, or else you're a dead duck.

—RANDY DARDEN
EAST LANSING, MI

GHOSTBUSTERS II: In the first level, turn right when you get the first piece of the beaker. Get the second piece and turn left.

To go faster in the second level, keep the Ghostbusters as far away from Libby as possible, and keep the fireball in the center of the screen as much as you can.

—KEVIN MIERZEJEWSKI
& DAVID FRANCESCHINA
ADDRESS UNKNOWN

HUNT FOR RED OCTOBER: A mouse is much better than a joystick for this game. If you don't have one yet, this can be your excuse to buy one.

Engage the Caterpillar drive as soon as you start the game, and increase speed to 15.0 knots. You can dive as deep as 100–115 meters and still be out of reach of all underwater objects. If you are going to speed up the clock, be sure you are in Caterpillar drive at full thrust. Otherwise, you're only wasting your time.

—RANDY DARDEN
EAST LANSING, MI

KINGS OF THE BEACH: Here are some useful passwords to enter at the registration tent: EAT ME enlarges all sprites; DRINK ME shrinks them again; LOGIC ON makes Randy and Sinjin play automatically against any opponent and always win; LOGIC OFF disables that; CHEAT ON lets you press the C key during a match or tournament to add a point to your score; CHEAT OFF disables the cheat.

Use these passwords to advance to the next city: SIDEOUT for Chicago; GEKKO for Hawaii; TOPFLITE for Rio de Janiero; SUNDEVIL for Australia.

—CHAD PALMAN
NEW FREEDOM, PA

KNIGHTS OF LEGEND: When making characters, you may want a Drezin Ranger because of his high charisma, which makes it easier to pry information from villagers. A Kelden is very useful, too, especially a Cliff Guard, because he can fly over walls and water. Try to have a few very strong characters, with strength levels well above 80. You only need two characters to specialize in Giant and Legendary Creature spells, because the other spells can be bought by any character.

When you are playing, go to Olanthan and ask a woman in a house about Alchemy. If you talk to the right one, you'll receive a quest to find a necklace in the valley to the west. When you return the necklace to her, you will receive a magic ingot, which is really a very light and powerful Halberd.

—ASAD ALI
WESTMONT, NJ ►

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SATISFACTION GUARANTEED

MEAN STREETS: Only two enemies appear on the screen at once, so when you take one of them out, another appears in his place.

In Cal Davis's lab, the burglar alarm switch is behind the rat cages. Move the cages, open the circuit box and flip the switch to disable the alarm. Don't taste broken glass or fool around with the gorilla, because they both can lead to death. Robert Knott lives at NC 0132.

—SAL CASTIGLIONE
SAYVILLE, NY

MIGHT & MAGIC II: In Middlegate, there is a Wizard at X-10, Y-2 who wants you to find a goblet for him. The goblet is in the southwest corner of the room directly west of the stairs in the dungeon. To open the door, you must first buy the green key from the Locksmith.

Take the goblet back to the Wizard, and he will give you the spell Eagle Eye, 2000 XP and 1000 gold! He will ask you to find it again if you face him after turning away. Tell him you will find it, then go get it again in the same place. Repeat the process until your character is as rich and powerful as you want him to be.

—ADAM POCALUJKA
WILLIAMSTON, MI

OMNI-PLAY BASKETBALL: To build your team's competitiveness, set up a dummy team. Since the dummy team will lose most of its games, it will always have lots of trading points. Use them to get top-notch players from other teams, then trade your own players with the dummy team so you can get those great players for a song. Within two or three seasons, you should have a team that is capable of taking the SBA Cup!

—STEVE TEDROW
MALO, WA

PLATOON: Here are some shortcut keys for this game: 7 will take you to the explosives, 8 will take you to the village and 9 will take you to the bridge. The 0 key will take you to the high green bushes.

—RICK GARNER
RUSHFORD, MN

POOL OF RADIANCE: When you go to the graveyard, enter the building emitting noxious fumes. Find the spectre and kill him, then return to the city council. They will pay you for eliminating some of the undead.

There are spectres in many of the other buildings. Kill all of them and get more reward money before seeking out the vampire. When you finally face the vampire, be sure you have the Efreeti bottle from the Kobold Caves. It will help you with the vampire and his minions.

—BEN ABERNATHY
BEND, OR

RAMPAGE: To know when you will be attacked by a helicopter, just watch the helicopter shadows in the background. If a shadow moves off the screen to the right, a helicopter will attack from the left, and vice versa. Also notice that if a helicopter attacks player one, the next attack will be on player two, then player one, and so on.

—DUSTIN WINTERS
SAYVILLE, NY

SCRABBLE: The instructions tell you that if you press the Pass key while a computer player is taking a turn, you will force it to place the word it is currently thinking of. If you press the key before the computer player thinks of a word, he will change tiles or pass. Since he won't get any score on that turn, you can outscore him by repeating the trick.

—DAVID M. JORDAN
BUDINGEN, GERMANY

SECRET OF THE SILVER BLADES: If you invade Marcus's house and kill his allies, you will get many magical items. If you purchase a Mage scroll, it will contain Cloud Kill, Delayed Blast Fireball and Globe of Invulnerability.

Save most of your gems to use in the well, because it takes lots of gems to get information from it. Use Detect Magic often, because there are lots of magical items to find. It's very important to have a dwarf in your group, since he or she will be useful in the mines. And speaking of the mines: When you enter a monster's lair and defeat it, you will receive gems and two magical items. Good luck!

—JEREMY YOUNG
GREENE, NY

SHINOBI: Here's how to play levels that you haven't been able to reach: Shut your disk drive off while playing on Level 1. Play the level to the end, and when you advance, you still appear to be on Level 1, but the computer thinks you're on Level 2! Repeat this procedure until the computer thinks you're on the level before the one you want to play. Turn the disk drive on, and you'll advance to the desired level when you defeat the Boss at the end of "Level 1!"

—BARNEY LEE
CANTON, OH

TV SPORTS: FOOTBALL: To tackle the punter when he is kicking, get on the right side of the defensive line, in front of the offensive line. Go left for two seconds, then right. Pull left and down on your joystick and press the button.

When receiving the ball on a punt, just pull down without trying to dodge the players on the computer's team. It is almost impossible to dodge them.

In the last $1^1/_2$ minutes of a quarter, the computer will run about 75 percent of the time. This is a good time to choose a 6–1 defense.

The computer throws more to the right than to the left, so make sure you have a good safety and/or cornerback on that side.

—FRANK LECH, JR.
CHICAGO, IL

WHO FRAMED ROGER RABBIT?: The Ink and Paint Club level is hard to complete, but you can sometimes get past it without even playing it. First boot the system in the normal way, then drive Benny across town. When you reach the end, remove the disk from your drive. The computer won't find the disk, so it will go back to Benny. Drive him across town two more times, then put the disk in the drive, label side up. Reset the drive by turning it off and then back on. If you're lucky, you'll be past the Ink and Paint Club. If you're not, start over and try again.

—RANDY CLARKE
COLORADO SPRINGS, CO ■

To submit your own C-64 or C-128 game tips for consideration, send them to Gold Mine, PO Box 101011, Pittsburgh, PA 15237. Put your name, complete address and Social Security number on every piece of paper you send, and please use $8^1/_2$-by-11-inch paper. Also be sure to state which Commodore computer your tip is for. Neatness and clarity count. RUN *pays $5 per submission upon publication.*

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COMMODORE CLINIC

Answers to questions on monitors, MIDI and more.

By ELLEN RULE

Q *I have a C-128 that recently started to display different-colored characters while in 64 mode only. Through the process of elimination, I've been able to rule out my 1571 drive, the RGB monitor and my Star NX-1000 printer. Is this a problem that an average layman can repair by replacing a chip or component, or must I send the unit to a shop?*

—PAUL COYNE
WESTLAKE, OR

A The video output of the C-128 is fairly complex. The 8564 VIC chip produces the various graphics used in 40-Column mode, while the 8563 produces the 80-Column RGBI mode. The 8564 VIC sends the video signals—sync/luma and chroma—out through two of its pins. The 40-column display is provided by the 8564 VIC, no matter which mode (128, 64 or CP/M) you're in.

Character color is controlled by the color RAM chip that communicates with the VIC. This is a soldered chip and not easily replaced by the layman. Moreover, such obscure causes as a defective memory chip on the low bank of the 64 side can lead to video problems. The only way to truly determine the source of your problem is through diagnostic testing by your Commodore-authorized repair technician.

Q *I'm interested in obtaining the super printer driver for the Okimate 20 mentioned in the April '90 geoWatch column, but I don't have a modem. Is there any other source besides Q-Link for the program?*

—GEORGE LUCKENBAUGH
SPRING GROVE, PA

A Try contacting your local Commodore users' group. If no one there has the program, the club may have a QuantumLink President's account, through which a member should be able to download the file for you.

You might also give serious consideration to obtaining a modem and the Q-Link telecommunications software. Because of its unique software, Q-Link is easy to use, and the rates are quite reasonable. (*RUN* offers the Commodore 1660 modem package, which includes a Q-Link starter kit, for only $10, plus $3.50 shipping.)

Finally, you could check with the public domain disk distributors advertising in the *RUN* Class Ads, especially those specifically mentioning GEOS in their ads. And don't forget *geoWorld Magazine* (38 Santa Ynez St., Santa Barbara, CA 93103), which has its own disk series, as well as advertisements for GEOS-specific public domain and commercial software.

Q *I'd like to interface my MIDI-compatible electronic keyboard with my C-64. Can you tell me what programs, interfaces and literature are available to help?*

—BOB MCKAIN
KINCARDINE, ONTARIO, CANADA

Q *I'm looking for a C-64 sequencer with at least eight tracks, MIDI support and, if possible, REU support.*

—CURTIS FULTON
TROUTDALE, OR

Q *Could you give me some tips on starting off with MIDI? I can't find any C-64 information in publications such as* Keyboard *or* Electronic Musician. *Are there any books available? What interfaces and sequencers do you recommend?*

—MICHAEL GOMEZ
HOUSTON, TX

A As you may know, MIDI (musical instrument digital interface) is a hardware and software standard for data exchange between musical instruments and computers. The basic components of a MIDI system for the C-64/128 are a MIDI interface, MIDI-specific 5-pin DIN cables, compatible software (sequencers, patches and libraries), and one or more MIDI-compatible musical instruments (such as a keyboard, synthesizer or drum machine.)

Without MIDI, the C-64's SID chip can produce three musical voices, which can be modified and controlled through a variety of software packages. With a MIDI interface, you can compose on a MIDI-compatible instrument and have the information fed into the C-64 for disk storage, modification and display, then played back on a concert-quality MIDI instrument. This can be useful for musical performance, composition or teaching. Refer to "Making Music with MIDI," in the July 1987 issue of *RUN*, for an overview of MIDI technology. For an in-depth look at making music on your Commodore, see "Bach to the Future" in the April 1990 issue of *RUN*.

Although not as many companies market 8-bit products, you may be able to find used MIDI hardware and software through your local Commodore users' group or Commodore store. The Boston Computer Society (One Center Plaza, Boston, MA 02108) has both a C-64 group and one specializing in music and computers. Although neither group specifically addresses MIDI on the C-64, you may find someone there with C-64 MIDI experience or with some hardware or software to sell.

Popular names in the 64 MIDI arena have been Dr. T's (220 Boylston St., Suite 206, Chestnut Hill, MA 02167), Dr. Evil Laboratories (PO Box 3432, Redmond, WA 98073) and Passport Design (625 Miramontes St., Suite 103, Half Moon Bay, CA 94019). Dr. T's Keyboard Controlled Synthesizer was created in versions for both the C-64 and C-128, and Passport's MIDI interface (reviewed in *RUN*, February 1986) and Master Tracks and Master Tracks Pro 128 come highly recommended. MIDI Music Shop from Broderbund Software (17 Paul Drive, San Rafael, CA 94089) supports up to eight musical parts distributed over four different external instruments, and is compatible with the Passport MIDI interface. QRS Music Rolls (1026 Niagara St., Buffalo, NY 14213) also works with Passport's interface.

MIDI is not limited to use with commercial software. For those with technical expertise, specifications for creating your own MIDI software and devices are available from the International MIDI Association (5316 West 57th St., Los Angeles, CA 90056). The C-64 has been quite popular with MIDI-oriented musicians, due to its availability and relatively low cost. However, as you've discovered by scanning the trade magazines, the ever-lowering cost of more powerful computers has led many musicians on to other MIDI-compatible computers.

Search your local library for back issues of publications such as *Keyboard* or *Electronic Musician* for references to the C-64. Books about MIDI itself may also be found in your library, or at a store where electronic keyboards are sold.

Q *I'm looking for a good source of C-64 and 128 programs listed according to category such as entertainment, productivity, utility, and so forth. What do you recommend?*

—Paul McGowan
Minneapolis, MN

A Perhaps the best we've come across in a long while is *Software Information for Commodore Computers*, which lists over 5000 software programs according to a variety of categories. For example, if you're looking for Commodore software for business, education or for personal use such as astrology, diet, music or genealogy, it's all here in this 438-page publication, which is updated twice a year. Each entry includes a description of the program, system requirements, price and manufacturer. It's available for $12.95 from MENU Publishing, PO Box MENU, Pittsburgh, PA 15241.

Q *Although it's served me well, I've finally had it with the monochrome output I've been using with my C-128 in 80-Column mode. I'd like to buy an RGB monitor, but all the model numbers I've seen (1902, 2002, 1084, and so on) have really confused me. Help!*

—G. Harrison
Pavilion, NY

A The proliferation of monitors has come about in an attempt to address the many output modes of the Commodore computers. In addition to its TV-compatible signal, the C-64 transmits a 40-column composite signal that may be used with either a color or monochrome composite monitor. The C-128 emits the composite signal, plus an 80-column, RGB-digital signal. In addition to an RGB-analog video signal, Amiga computers are also capable of composite video output.

Commodore has tried to resolve the confusion by manufacturing one monitor, the 1084S, that works with the C-64, C-128 and Amiga. The 1084S accepts both color and monochrome composite signals, as well as RGBI (digital) from the 128 and 128D, and RGB-analog from the Amiga. ■

Do you have questions about your Commodore computer system, software or programming? Just send them to Commodore Clinic, RUN Magazine, 80 Elm St., Peterborough, NH 03458. Queries are answered only through this column, and, due to the volume of mail, only those likely to appeal to a majority of our readers can be published.

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RUN's Checksum & Program Typing Hints

TYPE IN *RUN*'S CHECKSUM, which serves for both the C-64 and for the C-128 in either 40- or 80-Column mode, and save it to disk before running it. When typing in a program from *RUN*, first load and run *RUN*'s latest version of the Checksum program, which contains a new feature explained below. The screen will display a SYS number (49152 for the C-64; 3328 for the C-128) that deactivates and reactivates the Checksum. Always disable *RUN*'s Checksum before attempting to run another program. Note: You can abbreviate Basic keywords; spaces affect the checksum only when within quotes; and the order of characters affects the checksum.

When you press return after typing in a program line, a one-, two-, or three-digit number from 0 to 255 appears in the home position. If this number matches the checksum value in the program listing, the line as you typed it is correct. If the number that appears doesn't match the checksum value, compare the line with the magazine listing to find your error. Then move the cursor back up to the line and make your corrections. Now, after you press return, the correct checksum value should appear. Continue entering the listing until all the lines have been correctly typed. Then deactivate *RUN*'s Checksum, using the appropriate SYS number, and save the finished program.

We sometimes get letters and phone calls from new readers who have typed in the Checksum program for the first time. They are confused by the "Out of Data Error in Line 30" message that appears when they try to run the Checksum program. Understandably, they compare line 30 of the listing with line 30 as they typed it in, and cannot find anything wrong. The message unintentionally misleads them into thinking the error is in line 30, whereas the typing mistake is actually somewhere in one of the Data statements in lines 190–350.

So, we've added a new feature to the Checksum program that alerts readers to the number of the Data statement line in the Checksum program where an error has actually been made. **Note that this feature works *only* on the Checksum program itself, and not on any other program listing in *RUN*.**

After you've entered and saved the Checksum program to disk, run it. If you've made any errors in any of the Data statements, the program will give you a specific line number. Find the mistake, correct it, press return, save the program and run it again. Repeat this procedure until the Checksum program runs flawlessly.

Control Characters Demystified

All the graphics and control characters in the listings in *RUN* have been translated into understandable key combinations. They are the instructions you see inside the curly braces. For example, {SHIFT L} means you hold down the shift key while you press the L key once. You do *not* type in the curly braces. What appears on the screen will look quite different from what is designated inside the braces. Here are some more examples:

{22 SPACES}—press the space bar 22 times.

{SHIFT CLR}—hold down the shift key and press the clr-home key once.

{2 CRSR DNs}—press the cursor-down key twice.

{CTRL 1}—hold down the control key and press the 1 key.

{COMD T}—hold down the Commodore logo key and press the T key.

{5 LB.s}—press the British pound key (£, *not* #) five times.

Refer to the following paragraphs for any other Error messages you get from running any program listing in *RUN*.

Other Error Messages

Having heard from many users over the years about their difficulties with typing in listings, we've identified a few recurring problems that plague many people but are easy to fix. So read on and see if your problem is one of these.

- You get an "Out of Data in Line xxx" message. This means that a program line was reading from Data statements and reached the end of the data before it was done reading. There are two possible problems.

One might be with the program line that reads the data, usually a For-Next loop. Make sure you have the proper values for the loop, because if, for example, the listing has a loop of 0 to 150, and you've typed 0 to 160, you'll get the Out of Data message. If the loop is correct, then the problem lies in the Data statements themselves. One possibility is that you omitted a whole line of data. That's easy enough to find and correct. It's more likely that you've skipped one or more individual data items or typed in a period instead of a comma, which causes two data values to be read as one number. Check your typing carefully against the listing. Using *RUN*'s Checksum program when you type in listings from the magazine should help in this case.

- You get an "Illegal Quantity Error in Line xxx" message. This means you've read a number from a Data statement and tried to poke it into a memory address. The error occurs because the number is larger than 255 (the largest value a memory address can contain), which means that somewhere in your Data statements you've made an error by typing in a number larger than 255. Again, this is easy to check for and correct. First look in your Data statements for a number larger than 255. You might have added an extra digit, or perhaps you ran two numbers together (23456 instead of 234,56).
- You get a "Syntax Error in Line xxx" message. This could be almost anything. What it tells you is that there is something wrong in the indicated line. Usually you've misspelled a Basic keyword or omitted some required character. List the line and examine it carefully.
- You get an "Error in Data" message. This occurs in programs that add up all the data as read, and, when finished, compares that sum with what it should be if the data were typed in correctly. If it isn't the same, it means an error somewhere in typing the Data statements. Go back and check the data carefully. Correct the mistake(s), save the new version and try again.
- Finally, we urge everyone who intends to type in one of our listings to use *RUN*'s Checksum program, which will help you avoid every mistake we've mentioned above, except that it won't detect the omission of a line. Ⓡ

Listing. *RUN*'s Checksum program. This program is available on *RUN*'s BBS for users to download.

```
10 REM RUN'S CHECKSUM 64/128 - BOB KODADEK
20 MO=128:SA=3328:IF PEEK(40960)THEN MO=64:SA=49152
30 I=0:CK=0:CH=0:LN=190
40 FOR K=0 TO 16
50 FOR J=1 TO 10:READ B:IF B>255 THEN GOTO 170
60 CH=CH+B:POKE SA+I,B:I=I+1:NEXT
70 READ LC
80 IF LC<>CH THEN GOTO 170
90 CH=0:LN=LN+10
100 NEXT K
110 POKESA+110,240:POKESA+111,38:POKESA+140,234
120 PRINTCHR$(147)STR$(MO)" RUN CHECKSUM":PRINT
130 PRINT"TO TOGGLE ON OR OFF, SYS"SA:IF MO=128 THEN 1
    60
140 POKESA+13,124:POKESA+15,165:POKESA+25,124:POKESA+2
    6,165
150 POKESA+39,20:POKESA+41,21:POKESA+123,205:POKESA+12
    4,189
160 POKESA+4,INT(SA/256):SYS SA:NEW
170 PRINT"YOU HAVE A DATA ERROR IN LINE ";LN;"!":END
180 REM DO NOT CHANGE THESE DATA STATEMENTS!
190 DATA 120,162,24,160,13,173,4,3,201,24,884
200 DATA 208,4,162,13,160,67,142,4,3,140,903
210 DATA 5,3,88,96,32,13,67,152,72,169,697
220 DATA 0,141,0,255,133,176,133,180,166,22,1206
230 DATA 164,23,134,167,132,168,170,189,0,2,1149
240 DATA 240,58,201,48,144,7,201,58,176,3,1136
250 DATA 232,208,240,189,0,2,240,42,201,32,1386
260 DATA 208,4,164,180,240,31,201,34,208,6,1276
270 DATA 165,180,73,1,133,180,230,176,164,176,1478
280 DATA 165,167,24,125,0,2,133,167,165,168,1116
290 DATA 105,0,133,168,136,208,239,232,208,209,1638
300 DATA 169,42,32,210,255,165,167,69,168,170,1447
310 DATA 169,0,32,50,142,169,32,32,210,255,1091
320 DATA 32,210,255,169,13,32,210,255,104,168,1448
330 DATA 96,104,170,24,32,240,255,104,168,96,1289
340 DATA 56,32,240,255,138,72,152,72,24,162,1203
350 DATA 0,160,0,32,240,255,169,42,208,198,1304
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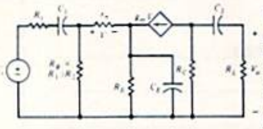

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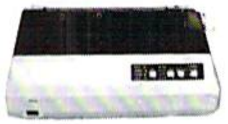

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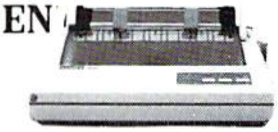

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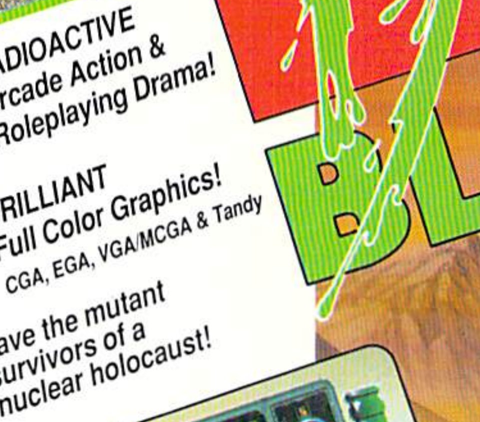

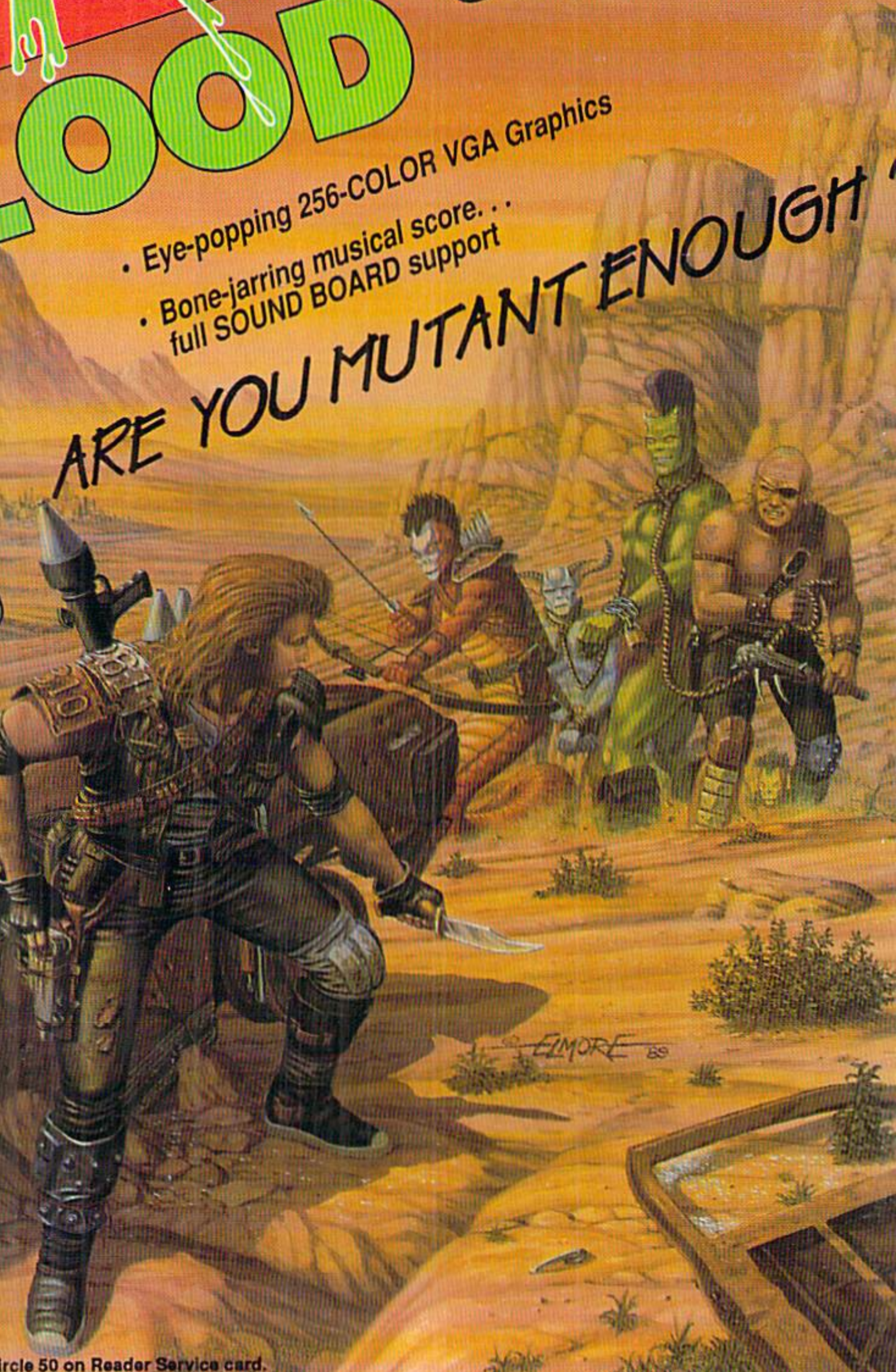

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